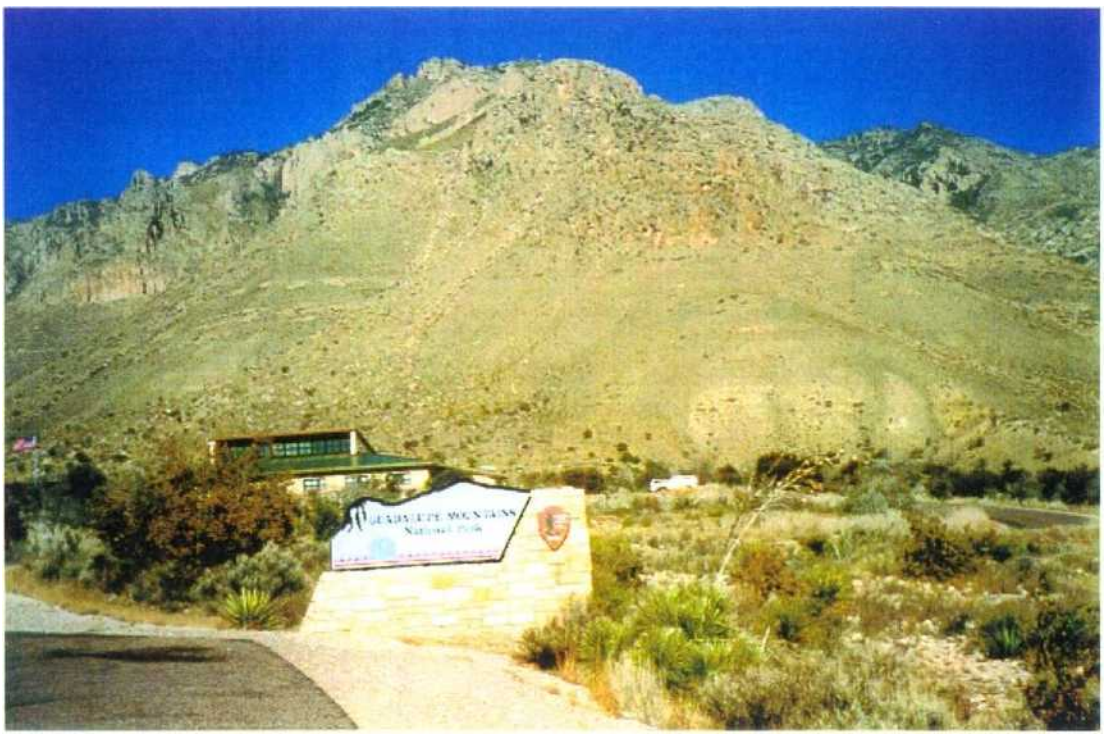
FINAL

2001 AIR EMISSIONS INVENTORY

GUADALUPE MOUNTAINS NATIONAL PARK
TEXAS



U.S. NATIONAL PARK SERVICE

JUNE 2003

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2001 AIR EMISSIONS **INVENTORY**

GUADALUPE MOUNTAINS NATIONAL PARK
TEXAS

Prepared for:

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Cover Photo: Entrance to Visitor Center off U.S. Highway 62/180

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1. INTRODUCTION

1.1 BACKGROUND

In August of 1999, the National Park Service (NPS) embarked on the Natural Resource Challenge, a major effort to substantially improve how the NPS manages the natural resources under its care. As part of Natural Resource Challenge, the NPS Air Resources Division (ARD) was tasked with the responsibility of expanding efforts to monitor and understand air quality and related values in the parks. In addition, the NPS Environmental Leadership policy directs the NPS to manage the parks in a manner "that demonstrates sound environmental stewardship by implementing sustainable practices in all aspects of NPS management...." In order to achieve both of these objectives, it is necessary to gain an understanding of air pollution emissions that result from activities within the park. In this regard, development of an in-park air emissions inventory for Guadalupe Mountains National Park (NP) serves three functions. First, it provides an understanding of the sources and magnitude of in-park emissions and a basis for contrasting them with emissions from the surrounding area. Second, it identifies existing and potential strategies to mitigate in-park air emissions. Finally, it evaluates and ensures the compliance status of the park relative to state and federal air pollution regulations.

1.2 TYPICAL AIR EMISSION SOURCES

Typical air emission sources within NPS units include stationary, area, and mobile sources. Stationary sources can include fossil fuel-fired space and water heating equipment, generators, fuel storage tanks, and wastewater treatment plants. Area sources may include woodstoves, fireplaces, campfires, and prescribed burning. Mobile sources may include vehicles operated by visitors, tour operators, and NPS and concessioner employees, and nonroard vehicles and equipment.

The air pollutants that are addressed in this report are summarized in the table below. Of the pollutants noted, ozone is not produced and emitted directly from stationary, area, or mobile sources, but rather it is formed as a result a chemical reaction of NOx and VOC emissions in the presence of sunlight. It is primarily an issue on the East Coast and Southern California, while particulate matter is more of an issue in the West. Carbon dioxide historically has not been considered a pollutant. However, in recent years, there has been much interest in its contribution to global climate warming since it is considered a greenhouse gas.

AIR POLLUTANTS AND THEIR CHARACTERISTICS

Pollutant	Characteristics
Particulates (PM~o)	• Mixture of solid particles and liquid droplets; fine particles (less than 2.5 micrometers) produced by fuel combustion, power plants, and diesel buses and trucks • Can aggravate asthma, produce acute respiratory symptoms, including aggravated coughing and difficult or painful breathing, and chronic bronchitis • Impairs visibility
Sulfur Dioxide (SO_2)	• Can cause temporary breathing difficulties for people with asthma • Reacts with other chemicals to form sulfate particles that are major cause of reduced visibility in many parts of the country
Nitrogen Oxides (NOx)	• High temperature fuel combustion exhaust product • Can be an irritant to humans and participates in the formation of ozone
Carbon Monoxide (CO)	• Odorless, colorless gas produced by fuel combustion, particularly mobile sources • May cause chest pains and aggravate cardiovascular diseases, such as angina • May affect mental alertness and vision in healthy individuals
Volatile Organic Compounds (VOCs)	• Fuel combustion exhaust product • Consists of a wide variety of carbon-based molecules • Participates in the formation of ozone
Ozone (0_3)	• Not directly emitted by mobile, stationary, or area sources • Formed from complex reactions between NOx and VOC emissions in the presence of sunlight • Occurs regionally due to multiplicity of sources • Can irritate the respiratory system • Can reduce lung function • Can aggravate asthma and increase susceptibility to respiratory infections • Can inflame and damage the lining of the lungs
Carbon Dioxide (CO_2)	• Does not directly impair human health • It is a greenhouse gas that traps the earth's heat and contributes to the potential for global warming

1.3 INVENTORY METHODOLOGY

The methodology to accomplish the air emissions inventory was outlined in a protocol that was prepared at the initiation of the project (EA Engineering 2001). Tasks consisted of a site survey in January 2003, interviews with Guadalupe Mountains NP personnel, review of applicable park records, emission calculations, review of applicable state and local air quality regulations, an assessment of mitigation measures and potential emission reduction initiatives, and report preparation. The data were used in conjunction with a number of manual and computer software computational tools to calculate emissions. Computational tools included U.S. Environmental Protection Agency (USEPA) emission factors such as the Factor Infoirnation Retrieval System (FIRE) database, USEPA *TANKS 4.0* model, U.S. Forest Service *First Order Fire Effects Model (FOFEM) 4.0* model, and USEPA *MOBILE6.2* mobile source emissions model. The year 2001

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was selected as the basis for the air emission inventory since data for that year were the most recent available at the park. It should be noted that emissions are expected to vary from year to year due to fluctuations in visitation, prescribed and wildland fires, and other activities. Additional information on emission estimation methodology, including emission factors, is provided in Appendices A and B.

1.4 PARK DESCRIPTION

Guadalupe Mountains NP, authorized by an act of Congress in 1966 and established in 1972, comprises 76,293 acres of mountain and desert land in West Texas. Congress established the park for its scientific and scenic values. The park consists primarily of the highest and southernmost portion of the Guadalupe Mountains, a range that extends northeasterly into New Mexico. Of the area within the park's boundaries, 46,850 acres are Congressionally designated wilderness. This designation precluded extensive development within the park and has limited the uses of much of the park to hiking, horseback riding, backpacking, and approved scientific research.

The park is located on the Texas- New Mexico Border, 110 miles east of El Paso, Texas, and 55 miles southwest of Carlsbad, New Mexico (see Figure 1). Part of the northern boundary adjoins the Lincoln National Forest and lands controlled by the Bureau of Land Management. U.S. Highway 62/180 passes through the southern end of the park and is the primary route by which visitors reach the park (Figure 2). State Road 137 in New Mexico provides access to the northern part of the park. The park is located in an undeveloped and sparsely populated area where the land is used predominantly for cattle and sheep ranching.

Included within the boundaries of the park are the sheer cliffs and peaks more than 8,000 feet high that make up the V-shaped southernmost extension of the Guadalupe Mountains. The mountain range is an uplifted segment of the Capitan reef, a limestone barrier reef that formed some 280 million years ago from algae in a shallow inland sea. The park also includes desert lowlands. The western side of the park encompasses a portion of the salt basin lying between the Guadalupes and the next range of mountains to the west, the Cornudas. These lowlands contain flora and fauna typical of the Chihuahuan desert of which they are a part. Williams Ranch, one of the park's cultural resources and located at the base of the mountains on the west side of the park, gives visitors a sense of the isolation of a rancher's life. On the eastern side, the park does not extend far beyond the base of the mountains.

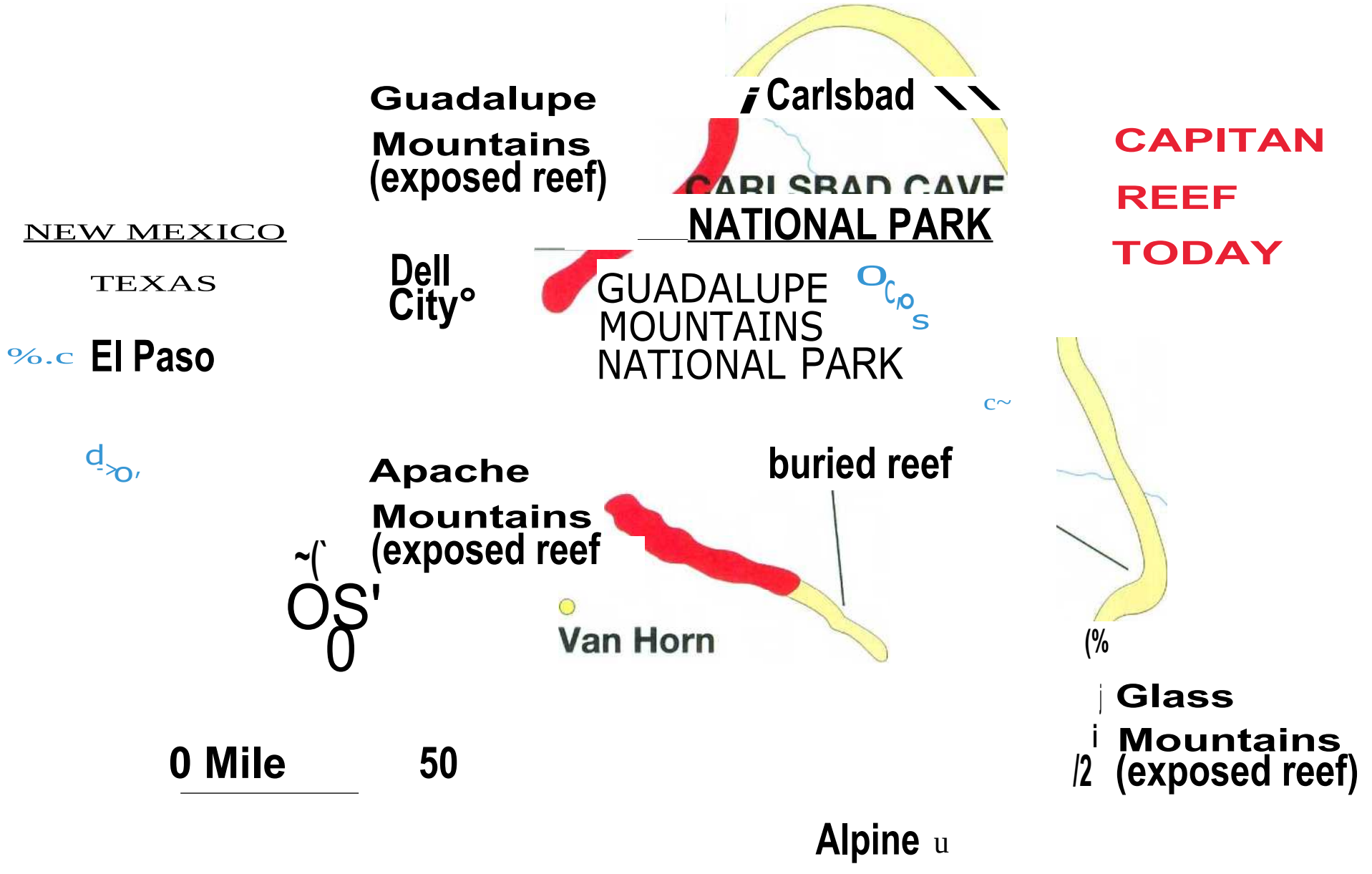
The most developed areas are concentrated on both sides of U.S. Highway 62/180. These include the Visitor Center/Headquarters and Campgrounds on the north side of the highway just within the park boundary (Figure 3) and the maintenance yard and employee residences on the other side of the highway. Table 1 provides a summary of the various facilities and their functions.

TABLE 1: GUADALUPE MOUNTAINS NP DEVELOPED AREAS

Name/Location	Function/Facilities
Pine Springs	Visitor Center, Headquarters, Campgrounds, Maintenance Yard and Shops, Resource Management Office, Ranger Station, and Employee Residences (19)
McKittrick Canyon	Ranger Contact Station, Trailhead to Pratt Cabin
Frijole Ranch House	History Museum
Dog Canyon	Contact Station, Employee Residence
Ship On The Desert	Temporary Researchers Housing, Servants Quarters
Williams Ranch House	Former Cattle Ranch

1.5 AIR QUALITY STATUS

The majority of the park, including all developed areas, is located in Culberson County, TX, with the western side of the park in Hudspeth County, TX. The area is in attainment for all the national ambient air quality standards (NAAQS). Guadalupe Mountains NP is designated a Class I airshed under the Clean Air Act, which requires the highest level of air-quality protection. Air quality in the park is influenced by that in the City of El Paso, TX, which is approximately 110 miles due west of the park. In particular, the 1-hour ozone level in El Paso has exceeded the standard at least once each year since 1999. The Commission on Environmental Quality (TCEQ) (formerly, the Texas Natural Resources Conservation Commission or TNRCC) is the governing authority for regulating air pollution from stationary sources in Texas.



FICURE 1. GUADALUPE MOUNTAINS NATIONAL PARK LOCATION

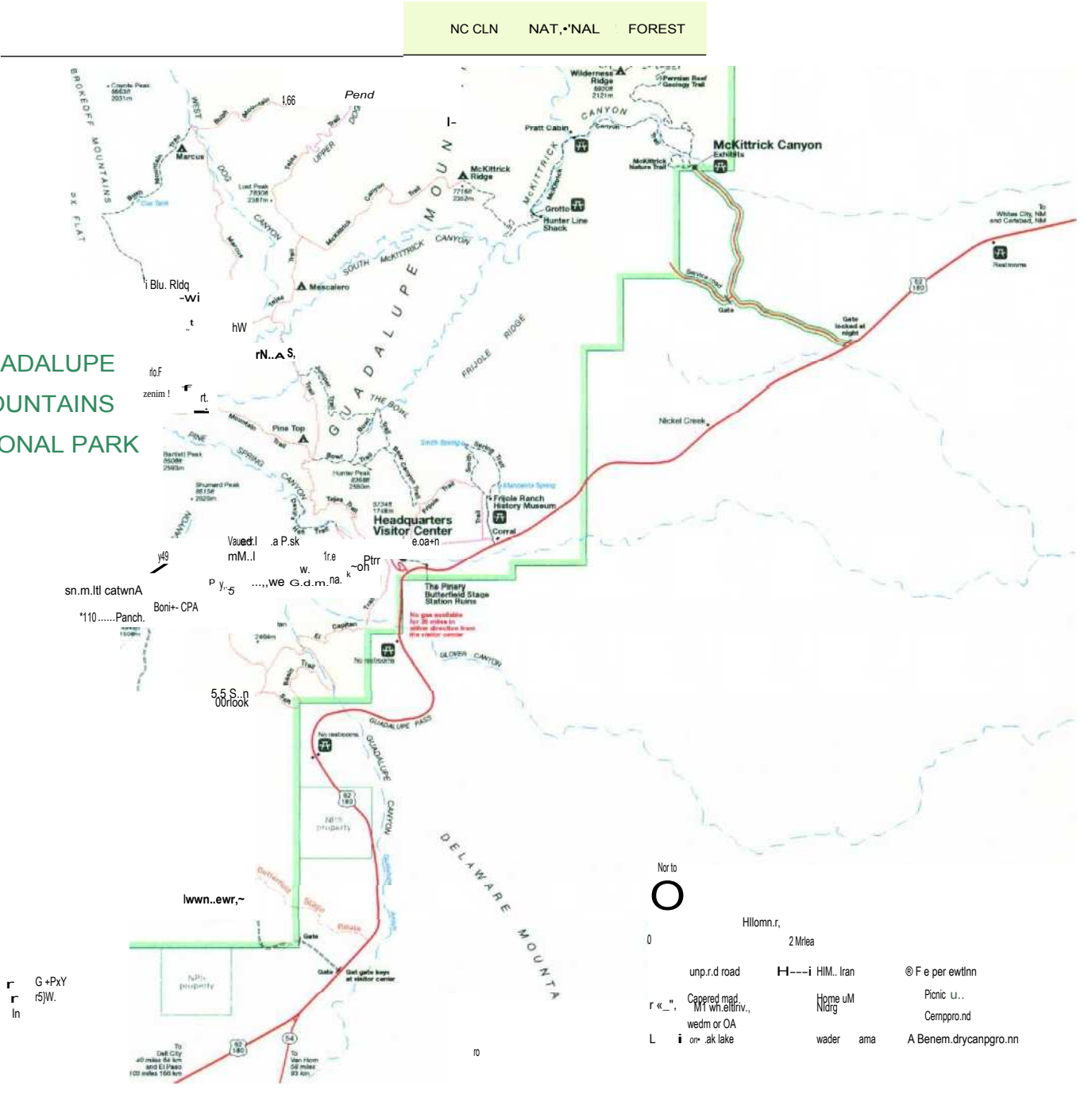


FIGURE 2. GUADALUPE MOUNTAINS NATIONAL PARK

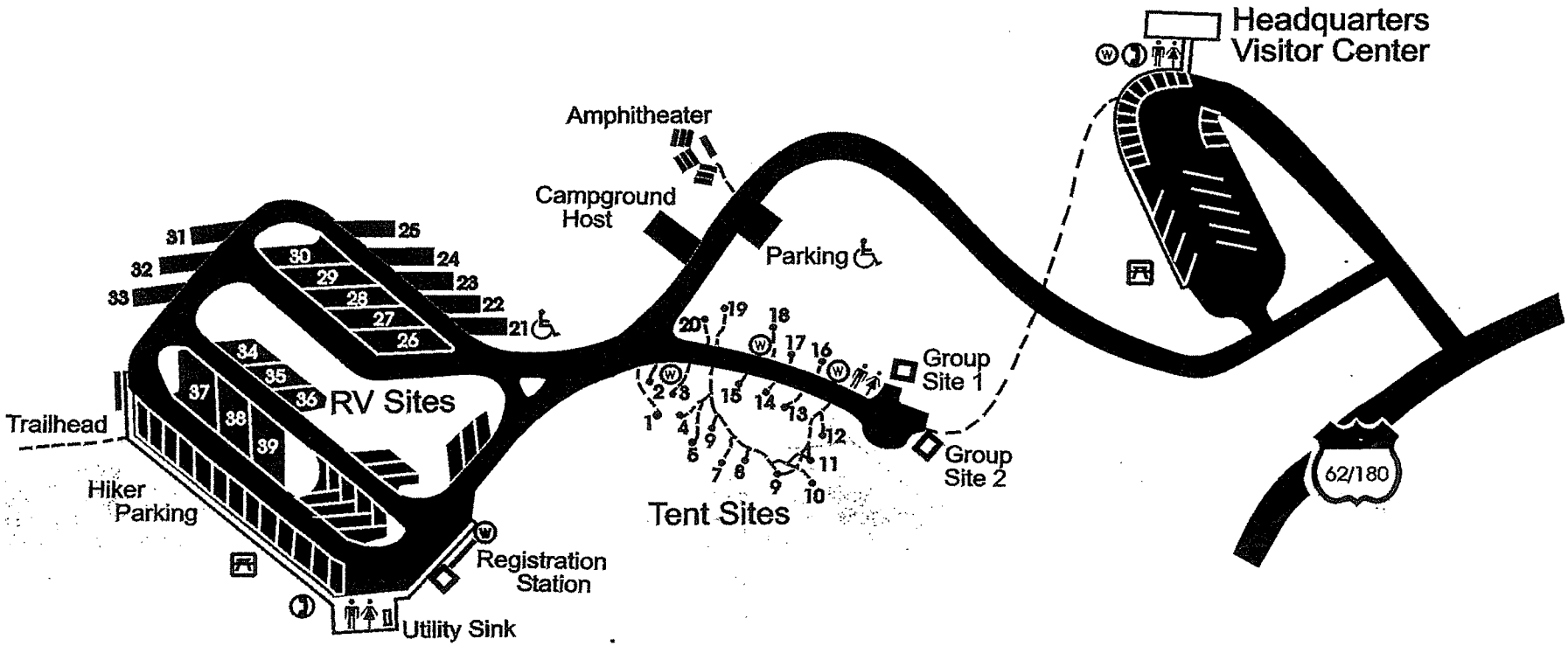


FIGURE 3. GUADALUPE MOUNTAINS NP VISITOR CENTER/HEADQUARTERS/CAMPGROUND

2. STATIONARY AND AREA **SOURCE** EMISSIONS

This section summarizes emissions from stationary sources at the Park for the year 2001. The discussion is divided into sections covering emissions from combustion sources, fuel storage sources, and area sources. The following emissions were calculated for each source: particulate matter (PM_{10}), sulfur dioxide (SO_2), nitrogen oxides (NO_X), carbon monoxide (CO), carbon dioxide (CO_2), and volatile organic compounds (VOCs).

2.1 STATIONARY **SOURCES**

2.1.1 Space And Water Heating Equipment

Heating units in the park are fueled by either propane or electricity. There are approximately thirty-four propane heating units in the park, and criteria emissions were calculated using the appropriate residential emission factors. For example, NO_X emissions from the propane furnace in the Visitor Center/Headquarters building were calculated as follows:

$$1{,}160\ gallons/yr \times \frac{18\ lb\ NOx}{1{,}000\ gallons} = 16\ lb\ PM10/yr$$

Actual criteria pollutant emissions from the heating equipment are summarized in Table 2. Potential emissions for the propane heating equipment also were calculated by assuming that the heating units were operated continuously during the year, and these emissions are noted in Table 3.

2.1.2 Generators

2.1.2.1 Generator Emissions - Actual

There are several relatively small emergency generators in the park. Emissions were calculated by multiplying the unit rating (kW) of the generators by an estimated annual run time (hr/yr) to get the kW-hr/yr, and the appropriate emission factors were then applied. For example, NO_X emissions from the 20 kW generator at the Visitor Center/Headquarters are calculated as:

$$20\ kW \times \frac{12\ hours}{year} \times \frac{1.34\ hp}{kW} \times \frac{0.00353\ lb\ PM}{hp\text{-}hr} = 1\ lb\ NOx/yr$$

Actual generator criteria emissions are summarized in Table 4.

TABLE 2. 2001 ACTUAL AIR EMISSIONS FROM GUADALUPE MOUNTAINS NP HEATING EQUIPMENT

Location (No.)	Fuel	Consumption (gallyr)	PM_{10} (Ibs/yr)	SO_2 (Ibs/yr)	NOx (lbs/yr)	CO (lbs/yr)	CO_2 (Ibs/yr)	VOC (lbs/yr)
Employee Housing (10)	Propane	3,221	1	0	45	6	40,268	1
Employee Housing (4)	Propane	966	0	0	14	2	12,081	0
Employee Housing (2)	Propane	445	0	0	6	1	5,557	0
Employee Housing (5)	Propane	886	0	0	12	2	11,074	0
Employee Housing (1)	Propane	264	0	0	4	1	3,302	0
Recreation Hall (I)	Propane	403	0	0	6	1	5,034	0
Auto Shop (3)	Propane	1,691	1	0	24	3	21,141	1
Maintenance Shop Break Room (1)	Propane	354	0	0	5	1	4,430	0
Carpenter Shop (1)	Propane	532	0	0	7	1	6,644	0
Emergency Services (1)	Propane	242	0	0	3	0	3,020	0
Wildland Fire Cache (2)	Propane	1,289	1	0	18	2	16,107	0
Visitor Center/ Headquarters (1)	Propane	1,160	0	0	16	2	14,497	0
Ship on The Desert (1)	Propane	483	0	0	7	1	6,040	0
Ship On the Desert Quarters (I)	Propane	64	0	0	1	0	805	0
	Total	12,000	5	0	168	23	150,000	4

TABLE 3. 2001 POTENTIAL AIR EMISSIONS FROM GUADALUPE MOUNTAINS NP HEATING EQUIPMENT

Location (No.)	Fuel	Consumption (gallyr)	PM_{10} (lbs/yr)	SO_2 (Ibs/yr)	NOx (Ibs/yr)	CO (Ibs/yr)	CO_2 (Ibs/yr)	VOC (lbs/yr)
Employee Housing (10)	Propane	95,738	38	0	1,340	182	1,196,21	29
Employee Housing (4)	Propane	28,721	11	0	402	55	359,016	9
Employee Housing (2)	Propane	13,212	5	0	185	25	165,148	4
Employee Housing (5)	Propane	26,328	11	0	369	50	329,098	8
Employee Housing (1)	Propane	7,850	3	0	110	15	98,131	2
Recreation Hall (I)	Propane	11,967	5	0	168	23	149,590	4
Auto Shop (3)	Propane	50,262	20	0	704	95	628,279	15
Maintenance Shop Break Room (1)	propane	10,531	4	0	147	20	131,639	3
Carpenter Shop (1)	Propane	15,797	6	0	221	30	197,459	5
Emergency Services (1)	Propane	7,180	3	0	101	14	89,754	2
Wildland Fire Cache (2)	Propane	38,295	15	0	536	73	478,689	11
Visitor Center/ Headquarters (1)	Propane	34,466	14	0	483	65	430,820	10
Ship on The Desert (1)	Propane	14,361	6	0	201	27	179.508	4
Ship On the Desert Quarters (1)	Propane	1,915	1	0	27	4	23,934	1
	Total	356,623	38	0	1,347	183	1,202,705	29

TABLE 4: **2001** ACTUAL GUADALUPE MOUNTAINS NP GENERATOR CRITERIA EMISSIONS

Location	Fuel	Rating (kW)	Run Time (hrs/yr)	PM_{10} (Ibs/yr)	SO_2 (lbs/yr)	NOx (Ibs/yr)	CO (lbs/yr)	CO_2 (Ibs/yr)	VOC (lbs/yr)
Visitor Center/ Headquarters	Propane	20	12	0	0	1	NA	0	0
McKittrick Contact Station	Propane	20	12	0	0	1	NA	0	0
			Propane Totals	0	1	2	NA	1	0
Employee Housing (2)	Gasoline	5.50	12	0	0	2	191	78	4
Employee Housing (3)	Gasoline	4.25	12	0	0	2	221	90	5
Employee Housing	Gasoline	10.00	12	0	0	2	174	71	4
Employee Housing	Gasoline	6.20	12	0	0	1	108	44	2
Employee Housing	Gasoline	14.90	12	0	0	3	259	105	5
B&U and Interpretation	Gasoline	9.00	12	0	0	2	156	64	3
Fire Cache	Gasoline	9.60	12	0	0	2	167	68	3
Pine Springs Comfort Station	Gasoline	4.25	12	0	0	1	74	30	2
			Gasoline Totals	1	1	14	1,349	548	27
			Park Totals	1	2	16	1,349	549	28

2.1.2.2 **Generator Emissions - Potential**

Potential emissions were also calculated for the generators, and the same emission factors that were used to calculate the actual emissions were used to calculate these potential emissions. To calculate potential emissions, EPA guidance on the number of hours of operation to assume was adopted:

> EPA does not recommend the use of 8,760 hours per year (i.e., full-year operation) for calculating PTE (potential to emit) for emergency generators...The EPA believes that 500 hours is an appropriate default assumption for estimating the number of hours that an emergency generator could be expected to operate under worst-case conditions.[1]

Potential criteria generator emissions are summarized in Table 5.

[1] *Calculating Potential to Emit (PTE) for Emergency Generators*, Office of Air Quality Planning and Standards (MD-10), U.S. Environmental Protection Agency, 06 September 1995.

TABLE 5: 2001 POTENTIAL GUADALUPE MOUNTAINS NP GENERATOR CRITERIA EMISSIONS

Location	Fuel	Rating (kW)	Run Time (hrs/yr)	PM_{10} (lbs/yr)	SO_2 (lbs/yr)	NO, (lbs/yr)	CO (lbs/yr)	CO_2 (lbs/yr)	VOC (lbs/yr)
Visitor Center/ Headquarters	Propane	20	500	2	18	47	NA	12	3
McKittrick Contact Station	Propane	20	500	2	18	47	NA	12	3
			Propane Totals	4	36	95	NA	23	5
Employee ,Housing (2)	Gasoline	5.50	500	5	4	81	7,960	3,235	162
Employee Housing (3)	Gasoline	4.25	500	6	5	94	9,226	3,750	188
Employee Housing	Gasoline	10.00	500	5	4	74	7,236	2,941	147
Employee Housing	Gasoline	6.20	500	3	2	46	4,486	1,824	91
Employee Housing	Gasoline	14.90	500	7	6	110	10,782	4,383	220
B&U and Interpretation	Gasoline	9.00	500	4	4	66	6,512	2,647	133
Fire Cache	Gasoline	9.60	500	5	4	71	6,947	2,824	142
Pine Springs Comfort Station	Gasoline	4.25	500	2	2	31	3,075	1,250	63
			Gasoline Totals	37	31	573	56,224	22,854	1,145
			Park Totals	41	67	667	56,224	22,877	1,150

2.1.3 Fuel Storage Tanks

Guadalupe Mountains NP has three gasoline and two diesel fuel aboveground fuel storage tanks for NPS vehicles and other motorized equipment. There are no public automotive service stations in the park.

There are two basic types of VOC emissions from storage tanks: working losses and standing losses. Working losses are composed of both withdrawal and refilling loss emissions. Withdrawal loss emissions result from the vaporization of liquid fuel residue on the inner surface of tank walls as the liquid levels in the tank are decreased and air is drawn into the tank. Refilling losses refer to fuel vapor releases to the air during the process of refilling the tank as the liquid level in the tank increases and pressurizes the vapor space. Standing losses describe those tank emissions from the vaporization of the liquid fuel in storage due to changes in ambient temperatures. VOC losses are also a direct function of the annual product throughput or turnovers. Emissions from diesel tanks are extremely small since the volatility of diesel fuel is

extremely low compared to gasoline. VOC emissions from the NPS fuel storage tanks were calculated using the USEPA *TANKS* software program. *TANKS* is based on the emission estimation procedures from Chapter 7 of EPA's Compilation of Air Pollutant Emission Factors (AP-42) and uses chemical, meteorological, and other data to generate emission estimates for different types of storage tanks. Table 6 summarizes the calculated emissions from the gasoline tanks.

TABLE 6: 2001 GUADALUPE MOUNTAINS NP FUEL TANK EMISSIONS

Location (No.)	Product	Tank Type	Volume (gal)	Throughput (gal/yr)	VOC (lbs/yr)
Pine Springs Maintenance (2)	Gasoline	AST	2,000	10,000	966
Dog Canyon	Gasoline	AST	1,000	1,700	362
			Total	11,700	1,328

2.1.4 Wastewater Treatment Plants

The only wastewater facilities in the park are septic tanks.

2.2 AREA SOURCES

2.2.1 Woodstoves/Fireplaces

There are no woodstoves or fireplaces in the park.

2.2.2 Campfires

There is one front-country campground in Pine Springs near the Visitor Center/Headquarters. However, wood and charcoal fires are not allowed due to the fire danger presented by generally dry conditions and intermittent high winds.

2.2.3 Wildland Fires and Prescribed Burning

Wildland fires are ignited naturally, usually by lightening and are typically suppressed, while prescribed fires are ignited intentionally in order to achieve fire management objectives. Prescribed burning is a land treatment process to accomplish natural resource management objectives, including reducing the potential for destructive wildfires, eliminating excessive fuel buildup, controlling insects and disease, improving wildlife habitat and forage production,

maintaining natural succession of plant communities, and restoring natural processes. Only prescribed burning emissions are considered as anthropogenic emissions.

Over the 1990-2002 time period, there were prescribed burns of timber and grass/shrub that covered approximately 1,620 acres or 135 acres a year on average. There were an additional 19,180 acres of wildland fires over the same 12-year period. The First Order Fire Effects Model (FOFEM) was used to estimate emissions. FOFEM is a computer program developed by the Intermountain Fire Sciences Lab, U.S. Forest Service to predict the effects of prescribed fire and wildfire in forests and rangelands throughout the U.S. In particular, it quantifies emissions of PM_{10}, $PM_{2.5}$, CO, $C0_2$, and CH_4 for wildland and prescribed fires, which are summarized in Table 7.

TABLE 7: WILDLAND FIRE AND PRESCRIBED BURNING AIR EMISSIONS FROM GUADALUPE MOUNTAINS NP

Type	Acres	PM10 (lbslyr)	$PM_{2.5}$ (Ibs/yr)	CO (Ibs/yr)	CO_2 (lbs/yr)	VOC[1] (lbs/yr)
Wildland Fire						
Sagebrush- Grass	800	8,800	7,200	3,200	44,800	3,210,400
Mesquite Oak	800	28,800	24,000	9,600	138,400	11,775,200
Total	1,600	37,600	31,200	12,800	183,200	14,985,600
Prescribed Burning						
Sagebrush- Grass	67	737	603	268	3,752	268,871
Mesquite Oak	68	2,448	2,040	816	11,764	1,000,892
Total	135	3,185	2,643	1,084	15,516	1,269,763

[1] As methane

2.2.4 Miscellaneous Area Sources

Miscellaneous area sources include food preparation, degreasers, paints and other surface coatings, lighter fluid consumption, consumer solvents, and propane use by visitors in recreational vehicles. However, there are no data on the consumption of these materials whose emissions are negligible.

2.3 SUMMARY OF STATIONARY AND AREA SOURCE EMISSIONS

Table 8 summarizes the stationary and area source emissions calculated above in a format that allows comparison between the various sources as well as providing totals for each pollutant or pollutant category under consideration.

TABLE 8: SUMMARY OF 2001 STATIONARY AND AREA SOURCE EMISSIONS AT GUADALUPE MOUNTAINS NP

Activity	Particulates (PM_{10})		Sulfur Dioxide		Nitrogen Oxides		Carbon Monoxide		Carbon Dioxide		VOCs	
	lbs/yr	tons/Yr	lbs/yr	tons/Yr	lbs/yr	tons/Yr	lbs/yr	tons/yr	lbs/yr	tons/yr	lbs/yr	tons/yr
Stationary Sources												
Heating Equipment	5	<0.01	<0.01	<0.01	168	0.08	23	0.01	150,000	75	4	<0.01
Generators	1	<0.01	2	<0.01	16	0.01	549	0.27	1,349	0.67	28	0.01
Gasoline Storage Tanks											1,328	0.66
Stationary Sources Subtotal	6	<0.01	2	<0.01	184	0.09	572	0.29	151,350	75.68	1,360	0.68
Area Sources												
Wildland Fires	37,600	18.8	--	--	--	--	183,200	91.60	14,985,600	7,492.80	12,800 [1]	6.40 [1]
Prescribed Burning	3,185	1.59	--	--	--	--	15,516	7.76	1,269,763	634.88	1,084 [1]	0.54 [1]
	40,785	20.39	--	--	--	--	198,716	99.36	16,255,363	8,127.68	13,884	6.94
Totals												
	Particulates ($PM_{,0}$)		Sulfur Dioxide		Nitrogen Oxides		Carbon Monoxide		Carbon Dioxide		VOCs	
	lbs/yr	tons/yr	lbs/yr	tons/yr	lbs/yr	tons/yr	lbs/yr	tons/yr	lbs/yr	tons/yr	lbs/yr	tonslyr
Totals without Prescribed Burning	6	<0.01	2	<0.01	184	0.09	572	0.29	151,350	75.68	1,360	0.68
Totals with Prescribed Burning	3,191	1.60	2	<0.01	184	0.09	16,088	8.04	1,421,113	710.56	2,444	1.22

As methane

3. MOBILE SOURCE EMISSIONS

This section summarizes emissions from mobile sources at Guadalupe Mountains NP for 2001. Mobile emission sources include highway and nonroad vehicles.

3.1 HIGHWAY VEHICLES

3.1.1 Visitor Vehicles

An estimated 203,000 visitors entered the park during the most recent year. However, the majority of these made a visit just to the Visitor Center that is a hundred or so feet off U.S. Highway 62/180. Of the total visitation, an estimated 30,380 traveled to the McKittrick Canyon trailhead/contact station on a 5-mile paved road, 21,800 visited Frijole Ranch that is approximately one mile on an unpaved road from the U.S. Highway, and 920 made the 7-mile unpaved road trip to Williams Ranch. Assuming a typical NPS visitor to vehicle ratio of 2.8, the estimated visitor vehicles travelling to these points and associated vehicle miles traveled were calculated and are summarized in Table 9.

TABLE 9: ESTIMATED **VISITOR VEHICLE TRAVEL** IN **GUADALUPE MOUNTAINS NP**

Destination	Vehicles	Vehicle Miles Traveled	
		Paved	Unpaved
McKittrick Canyon	10,800	108,500	--
Frijole Ranch	7,785	--	15,570
Williams Ranch	328	--	4,585
Total	18,913	108,500	20,155

The majority of mobile source emissions can be categorized as either exhaust or evaporative emissions. Exhaust emissions are related to the combustion of fuel in the engine and include VOC, NOx, CO, and PM_{10}. Exhaust emissions are dependent on a number of factors, including engine load, engine design and age, combustion efficiency, emissions equipment such as catalytic converters, and other factors. Evaporative emissions, which can occur while the vehicle is running or at rest, are related to the volatilization of fuel from vapor expansion, leaks and seepage, and fuel tank vapor displacement. Evaporative emissions are primarily dependent on daily temperature cycles and fuel volatility. In addition to vehicle exhaust, PKo emissions also result from brake and tire wear, as well as the re-entrainment of dust from paved and unpaved roads (referred to as fugitive dust).

Emission factors produced by the USEPA MOBILE6.2 model were used in conjunction with VMT data in order to estimate mobile source emissions for VOC (both exhaust and evaporative), NOx, CO, and PKo (exhaust, brake, and tire) for visitor vehicles. MOBILE6.2 produces exhaust and evaporative emission factors for light duty gasoline vehicles, light duty gasoline trucks, heavy duty gasoline vehicles, light duty diesel vehicles, light duty diesel trucks, heavy duty diesel vehicles, and motorcycles. It also produces a composite emission factor for all vehicles based on the vehicle VMT mix supplied to the model. Inputs to the model include average vehicle speed, vehicle VMT mix, inspection and maintenance (UM) program information, fuel information, 'ambient temperature data, elevation, and others. Fugitive PM$_{10}$ emissions resulting from tire-roadway interaction were based on EPA's road dust emission factors.

The MOBILE6.2 model is typically used to support planning and modeling efforts in urban or regional areas and include default inputs suited for these applications. Therefore, it is suitable for applications over large, regional transportation networks. Application of the MOBILE6.2 model required the utilization of unique inputs that were representative of mobile source activity within the park. In particular, it was necessary to utilize unique inputs for the visitor vehicle VMT mix and the vehicle age distribution. The Center for Environmental Research and Technology within the College of Engineering at the University of California's Riverside Campus (CE-CERT) established park-specific vehicle fleet characterizations in developing air emission inventories for Zion National Park (CE-CERT, 2001). CE-CERT found that the distribution of vehicle ages in the park reflected a larger fraction of newer vehicles compared to the general vehicle population. The park-specific mix vehicle types and vehicle age distribution developed by CE-CERT have been applied in the mobile modeling for Guadalupe Mountains NP.

In addition to park-specific age distribution, CE-CERT also developed park-specific modeling inputs for driving patterns that differ significantly from the default driving patterns typically used in mobile modeling, such as the Federal Test Procedure (FTP). In particular, they found that the FTP reflects both higher speeds and a wider range of speeds than observed in national parks. However, since the MOBILE6.2 model is not designed to readily incorporate unique driving pattern data, the default driving cycle remains the basis for the mobile source emission estimates provided here.

Other important mobile modeling inputs that can significantly affect mobile emission factors are the average speed, fuel characteristics, and UM program parameters. The average speed input to the mobile model was 35 mph, fuel volatility was assumed to be Reid vapor pressure (RVP) of 8.0 in the summer and 11.8 in the winter, and reformulated gasoline (RFG) was not assumed to

be present. Finally, UM program inputs were not included since there are no UM programs in the areas near the park.

In order to account for seasonal differences in mobile emissions, separate MOBILE6.2 runs were perfoinied to produce emission factors for winter and summer. A composite emission factor for each season, reflecting a park specific VMT mix adapted from CE-CERT, served as the basis for mobile source emission estimates. Additional particulate emissions (or entrained road dust) from vehicles operating on paved roads in Guadalupe Mountains NP also were calculated based on VMT. A summary of visitor vehicle emissions is provided in Table 12 at the end of this section.

3.1.2 GSA/NPS Highway Vehicles

Guadalupe Mountains NP operates a fleet of highway vehicles that are owned by the NPS or leased from the General Services Administration (GSA). Emission factors specific to vehicle classes (e.g., LDGVs) were used to estimate emissions from the NPS and GSA vehicles. Since vehicle mileages were not available, estimates were made based on another southeast park unit whose size is similar to Guadalupe Mountains NP. A summary of NPS and GSA vehicles and their estimated annual mileage is provided in Table 10, and emissions are summarized in Table 12 at the end of this section.

TABLE 10: NPS AND GSA ROAD VEHICLES AT GUADALUPE MOUNTAINS NP

Vehicle Type	Number	Annual Usage (mi/yr)
Light Duty Gasoline Vehicles (LDGV)		
Autos	7	30,130
Light Duty Gasoline Trucks (LDGT)		
Pickups	19	91,586
Sport Utility Vehicles	9	71,729
Total	28	163,315
Heavy Duty Gasoline Vehicles (HDGV)		
Trucks	7	31,448
Heavy Duty Diesel Trucks (HDDT)		
Heavy-Duty Trucks	6	21.813
Park Total	48	246,706

3.2 NPS NONROAD VEHICLES

The NPS also owns and operates nonroad motorized equipment that is used to maintain roads and grounds and for other purposes. There are records of the Guadalupe Mountains NP equipment inventory, and the larger pieces of equipment are noted in Table 11. Annual usage

and emission factors from the USEPA nonroad emission database were used to calculate annual emissions that are provided in Table 12.

TABLE 11: NPS NONROAD VEHICLES AT GUADALUPE MOUNTAINS NP

Vehicle Type	Number	Annual Usage (hrs/yr)
Grader	1	145
Backhoe	1	50
Sweepers	1	25
Forklift	2	100
Mowers	1	100
Utility Vehicle	2	130
ATVs	4	50
Loader	1	725
Tractor	1	350

3.3 SUMMARY OF MOBILE SOURCE EMISSIONS

Table 12 summarizes the mobile source emissions calculated above in a format that allows comparison between the various sources as well as providing totals for each pollutant or pollutant category under consideration.

TABLE 12: SUMMARY **OF 2001 MOBILE** SOURCE EMISSIONS AT GUADALUPE MOUNTAINS NP

Activity	Particulates (PM_{10})		Sulfur Dioxide		Nitrogen Oxides		Carbon Monoxide		VOCs	
	lbs/yr	tons/yr	lbs/yr	tons/yr	lbs/yr	tons/yr	lbs/yr	tons/yr	lbs/yr	tons/yr
Road Vehicles										
Visitor Vehicles	12,255[1]	6.13			1,147	0.57	3,464	1.73	209	0.10
NPS/GSA Road Vehicles	487[1]	0.24	--	-	1,420	0.71	9,231	4.62	489	0.24
Road Vehicle Emission Subtotal	12,742[1]	6.37	--	--	2,567	1.28	12,695	6.35	698	0.35
Nonroad Vehicles										
NPS Nonroad Vehicles	202	0.10	--	--	1,305	0.65	626	0.31	241	0.12
Totals										
	Particulates (PM_{10})		Sulfur Dioxide		Nitrogen Oxides		Carbon Monoxide		VOCs	
	lbs/yr	tons/yr	lbs/yr	tons/yr	lbs/yr	tons/yr	lbs/yr	tons/yr	lbs/yr	tons/yr
Totals	12,944	6.47	--	--	3,872	1.94	13,320	6.66	940	0.47

[1] Includes exhaust, brake, and tire PM_{10} and dust from paved and unpaved roads

4. GUADALUPE MOUNTAINS NP AND REGIONALEMISSION SUMMARY

4.1 GUADALUPE MOUNTAINS NP SUMMARY

A summary of Guadalupe Mountains NP emissions is provided in Table 13.

TABLE 13: ESTIMATED ANNUAL EMISSIONS FROM GUADALUPE MOUNTAINS NP

Source	PM_{10} (tons)	SO_2 (tons)	NOx (tons)	CO (tons)	VOCs (tons)
		Point Sources			
Heating Equipment	<0.01	<0.01	0.08	0.01	<0.01
Generators	<0.01	<0.01	0.01	0.27	0.01
Gasoline Storage Tanks	--	--	--	--	0.66
Subtotal	<0.01	<0.01	0.09	0.29	0.68
		Area **Sources**			
Wildland Fires	18.8	--	--	91.60	6.40[1]
Prescribed Burning	1.59	--	--	7.76	0.54[1]
Subtotal	20.39	--	--	99.36	6.94[1]
		Mobile **Sources**			
Road Vehicles	6.37		1.28	6.35	0.35
Nonroad Vehicles	0.10	--	0.65	0.31	0.12
Subtotal	6.47	--	1.94	6.66	0.47
		Totals			
Totals	8.06	<0.01	2.03	14.71	1.69

[1] As methane

4.2 REGIONAL AIR EMISSIONS

Emission estimates for Culberson and Hudspeth Counties and the State of Texas were obtained from the 1999 National Emission Inventory (NEI) maintained by USEPA. It is important to note that differences may exist between the methodologies used to generate the park emission inventory and those used to generate the NET. For example, here gasoline storage tanks have been included as stationary sources, while the NEI treats them as area sources. Table 14 provides a comparison of Guadalupe Mountains NP emissions with those from the surrounding counties and the state. For all pollutants, Guadalupe Mountains NP emissions account for less than 1 percent of the surrounding counties point source emissions.

TABLE 14: ESTIMATED ANNUAL EMISSIONS FROM GUADALUPE MOUNTAINS NP, SURROUNDING COUNTIES, AND THE STATE OF TEXAS

Area	PM_{10} (tons/yr)	SO_2 (tons/yr)	NOx (tons/yr)	CO (tons/yr)	VOC (tons/yr)
Point Sources					
Guadalupe Mountains NP Totals	<0.01	<0.01	0.09	0.29	0.68
Culberson County	67	5	654	73	7
Hudspeth County	21	<1	219	13	2
Surrounding County Totals	88	5	873	86	9
Texas Totals	54,699	977,386	920,494	463,369	251,840
Area Sources					
Guadalupe Mountains NP Totals	20	--	--	99	7[1]
Culberson County	914	3	4	9	145
Hudspeth County	2,385	4	6	54	140
Surrounding County Totals	3,299	7	10	63	285
Texas Totals	797,799	8,361	40,542	532,559	545,339
Mobile Sources					
Guadalupe Mountains NP Totals	6.47	--	1.94	6.66	0.47
Culberson County	57	55	1,682	5,063	567
Hudspeth County	100	102	2,897	8,519	969
Surrounding County Totals	157	157	4,579	13,582	1,536
Texas Totals	1,873,475	113,121	1,274,494	5,161,011	600,335

5. COMPLIANCE AND RECOMMENDATIONS

5.1 COMPLIANCE

The Texas Commission on Environmental Quality (TCEQ) is the governing authority for regulating air pollution in the park. Park personnel should coordinate with the agency on permit issues relating to stationary sources, as well as prescribed burning activities. Prior to replacing or adding relatively large heating units, generators, and fuel storage tanks, the appropriate agency should be consulted regarding the need to obtain a permit to construct or a permit to operate such sources. For example, the Texas Administrative Code Title 30, Part 1, Chapter 106, Subchapter G, Rule/106.183 and Rule/106.183 exempt from its permit requirements:

- Fuel burning equipment that uses gaseous fuel and has a design rate of less than forty (40) million Btu per hour
- Fuel burning equipment that uses distillate oil as backup fuel only
- Emergency standby generators that are rated at less than 500 hp.

Although campfires and other open burning are not permitted in the park, Rule/111.207 authorizes open burning for "... fires used solely for recreational and ceremonial purposes, or in the noncommercial preparation of food, or used exclusively for the purpose of supplying warmth during cold weather." Regulations pertaining to prescribed burning are addressed in Rule /111.211. Measures to prevent the creation of fugitive dust also must be taken, and regulations require that persons handling, transporting, or storing materials take reasonable precautions to prevent particulate matter from becoming airborne (Rule/111.143). The park appears to be in compliance with the these regulations that are included in Appendix D of this report.

5.2 RECOMMENDATIONS

Actions to promote sustainable development in the design, retrofit, and construction of park facilities have associated air quality benefits. These include actions that reduce or replace consumption of conventional fossil fuels and/or reduce the consumption of other resources. Reductions in potable and non-potable water consumption also achieve concurrent reductions in energy consumption and associated air emissions. Acquisition of energy efficient appliances whenever possible also is an incremental energy saving measure that has associated air quality benefits.

Current park initiatives include the use of renewable energy resources, energy and water conservation measures, and a recycling program. Photovoltaic systems are in use at the Pratt Cabin in McKittrick Canyon, Pine Top Cabin in the backcountry, and for two radio repeater

sites. There are occupancy sensors in restrooms and at the maintenance shops, and water saving fixtures have been installed in restrooms and employee housing. Waterless urinals are in place at the public restrooms at the Visitor Center, at the Pine Springs Campground, the Maintenance Shop, and the Mckittrick Canyon contact station.

The only air quality issue raised by the park was directed at existing and proposed oil and gas well developments in the Otero Mesa area in New Mexico approximately 40 miles northwest of the park. Although several wildcat wells have been drilled in the greater Otero Mesa Area in the past 80 years, they have never produced a viable commercial operation. However, in the late 1990s, an oil and gas company produced a commercially viable find of natural gas at a depth of 7,100 feet hit. The Bureau of Land Management (BLM) has been working for several years on an Environmental Impact Statement for the Greater Otero Mesa Area. This has been a frequently raised issue by other mid-western and western park. In recent years, the NPS Air Resources Division (ARD) has been monitoring energy developments in these areas and seeks opportunities to engage in the process.

6. REFERENCES

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APPENDIX A

FUEL DATA AND EMISSION FACTORS

FUEL DATA

Fuel	Heating Value	Sulfur Content
No. 2 Distillate Fuel Oil/Diesel	140,000 Btu/gal	0.05% by weight
Natural Gas	1,050 Btu/ft^3	2,000 grains/10^6 ft^3
Propane	91,500 Btu/gal	0.18 grains/100 ft^3

STATIONARY SOURCE EMISSION FACTORS - BOILERS/HEATING UNITS

DISTILLATE OIL (DF-2) - CRITERIA POLLUTANTS

Combustor Type	Emission Factor (lb/1,000 gal fuel burned)				
	PM[a]	SO_2[6]	NO_X[e]	CO	VOC[d]
Residential Furnace[e]	0.4	142S	18	5	0.713
Boilers < 100 Million Btu/hr (Commercial/Institutional Combust.°)	2	142S	20	5	0.34
Boilers < 100 Million Btu/hr (Industrial Boilers[s])	2	142S	20	5	0.2
Boilers > 100 Million Btu/hr (Utility Boilers[h])	2	157S	24	5	--

Source: AP-42, 5th Edition, Supplements A, B, C, D, and E, Tables 1.3-1 and 1.3-3.

NATURAL GAS - CRITERIA POLLUTANTS

Combustor Type (MMBtu/hr Heat Input)	Emission Factor (lb/10^6 ft^3 fuel burned)				
	PM@	SO_2	NO_X	CO	VOC
Residential Furnaces (<0.3)					
-Uncontrolled	7.6	0.6	94	40	5.5
Tangential-Fired Boilers (All Sizes)					
-Uncontrolled	7.6	0.6	170	24	5.5
-Controlled-Flue gas recirculation	7.6	0.6	76	98	5.5
Small Boilers (<100)					
-Uncontrolled	7.6	0.6	100	84	5.5
-Controlled-Low NO_X burners	7.6	0.6	50	84	5.5
-Controlled-Low NO_X burners/Flue gas recirculation	7.6	0.6	32	84	5.5
Large Wall-Fired Boilers (>100)					
-Uncontrolled (Pre-NSPS)[k]	*7.6*	*0.6*	280	84	5.5
-Uncontrolled (Post-NSPS)[k]	7.6	0.6	190	84	5.5
-Controlled-Low NO_X burners	7.6	0.6	140	84	5.5
-Controlled-Flue gas recirculation	7.6	0.6	100	84	5.5

Source: AP-42, 5th Edition, Supplements A, B, C, D, and E, Tables 1.4-1 and 1.4-2.

STATIONARY SOURCE EMISSION FACTORS - BOILERS/HEATING UNITS (Continued)

PROPANE (LPG) - CRITERIA POLLUTANTS					
Combustor Type	Emission Factor (lb/1,000 al fuel burned)				
	PM[a]	SO,[b]	NO,,[c]	CO	VOC[a]
Commercial Boilers[f]	0.4	0.105	14	1.9	0.3
Industrial Boilers[g]	0.6	0.10S	19	3.2	0.3
Source: AP-42, 5th Edition, Supplements A, B, C, D, and E, Table 1.5-1.					

STATIONARY SOURCE EMISSION FACTORS - GENERATORS

For generators rated at less than or equal to 448 kW (600 hp):

Fuel Type	Emission Factor (lb/hp-hr)				
	PM	SO,	NO,	CO	VOC
DF-2	2.20 E-03	2.05 E-03	0.031	6.68 E-03	2.51 E-03
Gasoline	7.21 E-04	5.91 E-04	0.011	0.439	0.022
Natural Gas/Propane	1.54 E-04	7.52 E-03(S)	3.53 E-03	8.6 E-04	1.92 E-04
Source: AP-42, 5th Edition, Supplements A, B, C, D, and E, Table 3.3-1 and 3.1-1					

For generators rated at greater than 448 kW (600 hp):

Fuel Type	Emission Factor (lb/hp-hr)				
	PM	SO$_X$[b]	NO$_X$	CO	VOC
DF-2	0.0007	(8.09 E-03)S	0.024	5.5 E-03	6.4 E-04
Source: AP-42, 5th Edition, Supplements A, B, C, D, and E, Table 3.4-1.					

FIREPLACE EMISSION FACTORS

Fuel Type	Emission Factor (lb/ton)				
	PM[@]	SO$_X$	NW'[j]	CO	VOC
Wood	34.6	0.4	2.6	252.6	229.0
Source: AP-42, 5th Edition, Supplements A, B, C, D, and E, Table 1.9-1.					

WOODSTOVE EMISSION FACTORS

Stove Type	Emission Factor (lb/ton)				
	PM°	SO_X	$NO_X^{(c)}$	CO	VOC
Conventional	30.6	0.4	2.8	230.8	53
Noncatalytic	19.6	0.4	--	140.8	12
Catalytic	20.4	0.4	2.0	104.4	15
Source: AP-42, 5th Edition, Supplements A, B, C, D, and E, Table 1.10-1.					

STATIONARY SOURCE EMISSION FACTORS - SURFACE COATING OPERATIONS

Surface Coating Type	VOC Emission Factor (lb/gal)
Paint: Solvent Base	5.6
Paint: Water Base	1.3
Enamel: General	3.5
Lacquer: General	6.1
Primer: General	6.6
Varnish/Shellac: General	3.3
Thinner: General	7.36
Adhesive: General	4.4
Source: *Calculation Methods for Criteria Air Pollutant Emission Inventories*, AL/OE-TR-1994-0049, July 1994. Armstrong Laboratory.	

(a) PM = Filterable Particulate Matter.
(b) These factors must be multiplied by the fuel sulfur content (for example, if the sulfur content is 0.05%, then S equals 0.05).
(c) Expressed as NO_2.
(d) Emission factors given in AP-42 are actually for non-methane total organic compounds (NMTOC) which includes all VOCs and all exempted organic compounds (such as ethane, toxics and HAPs, aldehydes and semivolatile compounds) as measured by EPA reference methods.
(e) Unit Rating <300,000 Btu/hr.
(f) Unit Rating 3300,000 Btu/hr, but <10,000,000 Btu/hr.
(g) Unit Rating 310,000,000 Btu/hr, but <100,000,000 Btu/hr.
(h) Unit Rating 3100,000,000 Btu/hr.
(i) POM = Particulate POM only.
(j) PM = Filterable Particulate Matter + Condensible Particulate Matter.
(k) NSPS = New Source Performance Standard as defined in 40 CFR 60 Subparts D and Db. Post-NSPS units are boilers with greater than 250 MMBtu/hr of heat input that commenced construction, modification, or reconstruction after August 17, 1971, and units with heat input capacities between 100 and 250 MMBtu/hr that commenced construction, modification, or reconstruction after June 19, 1984.
(1) Emission factors are given on a fuel input basis (]b/MMBtu). To convert to a power output basis (lb/hp-hr), use an average brake-specific fuel consumption (BSFC) of 7,000 Btu/hp-hr.

APPENDIX B

EMISSION CALCULATIONS

2001 ACTUAL CRITERIA EMISSIONS FROM HEATING UNITS AT GUADALUPE MOUNTAINS NATIONAL PARK

Emission Source	Location	Fuel	Number of Sources	Capacity (Btu/hr)		Consumption (gal/yr)	PM (Ibs/yr)	SO_2 (lbs/yr)	NO_X (lbs/yr)	CO (Ibs/yr)	CO_2 (lbs/yr)	VOC (Ibs/yr)
Furnace	Employee Housing	Propane	10	100,000	1,000,000	3,221	1	0	45	6	40,268	1
Furnace	Employee Housing	Propane	4	75,000	300,000	966	0	0	14	2	12,081	0
Furnace	Employee Housing	Propane	2	69,000	138,000	445	0	0	6	1	5,557	0
Furnace	Employee Housing	Propane	5	55,000	275,000	886	0	0	12	2	11,074	0
Furnace	Employee Housing	Propane	1	82,000	82,000	264	0	0	4	1	3,302	0
Furnace	Recreation Hall	Propane	1	125,000	125,000	403	0	0	6	1	5,034	0
Furnace	Auto Shop	Propane	3	175,000	525,000	1,691	1	0	24	3	21,141	1
Furnace	Maintenance Shop Break Room	Propane	1	110,000	110,000	354	0	0	5	1	4,430	0
Furnace	Carpenter Shop	Propane	1	165,000	165,000	532	0	0	7	1	6,644	0
Furnace	Emergency Services	Propane	1	75,000	75,000	242	0	0	3	0	3,020	0
Furnace	Wildland Fire Cache	Propane	2	200,000	400,000	1,289	1	0	18	2	16,107	0
Furnace	Visitor Center/Headquarters	Propane	1	360,000	360,000	1,160	0	0	16	2	14,497	0
Furnace	Ship on The Desert	Propane	1	150,000	150,000	483	0	0	7	1	6,040	0
Furnace	Ship On the Desert Quarters	Propane	1	20,000	20,000	64	0	0	1	0	805	0
		Propane Totals!	34		3,725,000	12,000	5	0	168	23	150,000	4
		Park Totals	34				5	0	168	23	150,000	41

	Emission Factors (Ibs/1,000 gal)					
Propane	0.4	0.005	14	1.9	12,500	0.3
No. 2 Oil	0.4	7.1	18	5	21,500	0.713

2001 POTENTIAL CRITERIA EMISSIONS FROM **HEATING UNITS** AT **CARLSBAD CAVERNS** NATIONAL PARK

Emission Source	Location	Fuel	Number of Sources	Capacity (Btu/hr)		Consumption (gal/yr)	PM (lbs/yr)	SO_2 (Ibs/yr)	NO_X (lbs/yr)	CO (Ibs/yr)	CO_2 (Ibs/yr)	VOC (Ibs/yr)
Furnace	Employee Housing	Propane	10	100,000	1,000,000	95,738	38	0	1,340	182	1,196,721	29
Furnace	Employee Housing	Propane	4	75,000	300,000	28,721	11	0	402	55	359,016	9
Furnace	Employee Housing	Propane	2	69,000	138,000	13,212	5	0	185	25	165,148	4
Furnace	Employee Housing	Propane	5	55,000	275,000	26,328	11	0	369	50	329,098	8
Furnace	Employee Housing	Propane	1	82,000	82,000	7,850	3	0	110	15	98,131	2
Furnace	Recreation Hall	Propane	1	125,000	125,000	11,967	5	0	168	23	149,590	4
Furnace	Auto Shop	Propane	3	175,000	525,000	50,262	20	0	704	95	628,279	15
Furnace	Maintenance Shop Break Room	Propane	1	110,000	110,000	10,531	4	0	147	20	131,639	3
Furnace	Carpenter Shop	Propane	1	165,000	165,000	15,797	6	0	221	30	197,459	5
Furnace	Emergency Services	Propane	1	75,000	75,000	7,180	3	0	101	14	89,754	2
Furnace	Wildland Fire Cache	Propane	2	200,000	400,000	38,295	15	0	536	73	478,689	11
Furnace	Visitor Center/Headquarters	Propane	1	360,000	360,000	34,466	14	0	483	65	430,820	10
Furnace	Ship on The Desert	Propane	1	150,000	150,000	14,361	6	0	201	27	179,508	4
Furnace	Ship On the Desert Quarters	Propane	1	20,000	20,000	1,915	1	0	27	4	23,934	1
		Propane Totals'	6		3,725,000	356,623	38	0	1,347	183	1,202,705	29
		Park Totals	6				38	0	1347	183	1,202,705	291

Emission Factors Ps/1,000 gal)

Propane	0.4	0.005	14	1.9	12,500	0.3
No. 2 Oil	0.4	7.1	18	5	21,500	0.713

2001 ACTUAL CRITERIA EMISSIONS FROM GENERATORS AT **GUADALUPE MOUNTAINS MOUNTAINS NP**

Emission Source	Location	Fuel	Number of Sources	Rating (kW)	Run Time (hrs/yr)	Output (kW-hr/yr)	PM (lbs/yr)	SO_2 (lbs/yr)	$NO_{,,}$ (lbs/yr)	CO_2 (Ibs/yr)	CO (Ibs/yr)	VOC (lbs/yr)
Generator	Visitor Center/Headquarters	Propane	1	20	12	240	0	0	1		0	0
Generator	McKittrick Contact Station	Propane	1	20	12	240	0	0	1		0	0
	Propane Generator Totals		2	40	24	480	0	1	2		1	0
Emission Factors from AP-42, Chapter 3.1-1 for natural gas large uncontrolled gas turbines (lb/hp-hr), S=.18 Formula = Emission Factor (lb/hp-hr) * 608 (g/kW-hr / lb/hp-hr) * Output (kW-hr/yr) / 453.6 (glib)							1.54E-04	7.52E-03*S	3.53E-03		8.60E-04	1.92E-04
Generator	Employee Hosusing	Gasoline	2	5.50	12	132	0	0	2	191	78	4
Generator	Employee Hosusing	Gasoline	3	4.25	12	153	0	0	2	221	90	5
Generator	Employee Hosusing	Gasoline	1	10.00	12	120	0	0	2	174	71	4
Generator	Employee Hosusing	Gasoline	1	6.20	12	74	0	0	1	108	44	2
Generator	Employee Hosusing	Gasoline	1	14.90	12	179	0	0	3	259	105	5
Generator	B&U and Interpretation	Gasoline	1	9.00	12	108	0	0	2	156	64	3
Generator	Fire Cache	Gasoline	1	9.60	12	115	0	0	2	167	68	3
Generator	Pine Springs Comfort Station	Gasoline	1	4.25	12	51	0	0	1	74	30	2
	Gasoline Generator Totals		11		96	932	1	1	14	1,349	548	27
Emission Factors from AP-42, Chapter 3.4-1 for generators rated less than 448 kW, S=.05 Fommla = Output (kW-hr/yr) * 1.34 (hp/kW) * Emission Factor (lb/hp-hr)							7.10E-04	5.91 E-04	1.10E-02	1.08E+00	4.39E-01	2.20E-02
						Park Totals (lbs/yr)	1	2	16	1,349	549	28
						Park Totals (tons/yr)	0.00	0.00	0.01	0.67	0.27	0.01

2001 ACTUAL CRITERIA EMISSIONS FROM GENERATORS AT **GUADALUPE MOUNTAINS MOUNTAINS NP**

Emission Source	Location	Fuel	Number of Sources	Rating (kW)	Run Time (hrs/yr)	Output (kW-hr/yr)	PM (lbs/yr)	SO_2 (Ibs/yr)	NO_x (Ibs/yr)	CO_2 (Ibs/yr)	CO (Ibs/yr)	VOC (lbs/yr)
Generator	Visitor Center/Headquarters	Propane	1	20	500	10,000	2	18	47		12	3
Generator	McKittrick Contact Station	Propane	1	20	500	10,000	2	18	47		12	3
	Propane Generator Totals		2	40	1,000	20000	4	36	95		23	5
Emission Factors from AP-42, Chapter 3.1-1 for natural gas large uncontrolled gas turbines (lb/hp-hr), Formula = Emission Factor (lb/hp-hr) * 608 (g/kW-hr / lb/hp-hr) * Output (kW-hr/yr) / 453.6 (glib)						S=.18	1.54E-04	7.52E-03*S	3.53E-03		8.60E-04	1.92E-04
Generator	Employee Hosusing	Gasoline	2	5.50	500	5,500	5	4	81	7,960	3,235	162
Generator	Employee Hosusing	Gasoline	3	4.25	500	6,375	6	5	94	9,226	3,750	188
Generator	Employee Hosusing	Gasoline	1	10.00	500	5,000	5	4	74	7,236	2,941	147
Generator	Employee Hosusing	Gasoline	1	6.20	500	3,100	3	2	46	4,486	1,824	91
Generator	Employee Hosusing	Gasoline	1	14.90	500	7,450	7	6	110	10,782	4,383	220
Generator	B&U and Interpretation	Gasoline	1	9.00	500	4,500	4	4	66	6,512	2,647	133
Generator	Fire Cache	Gasoline	1	9.60	500	4,800	5	4	71	6,947	2,824	142
Generator	Pine Springs Comfort Station	Gasoline	1	4.25	500	2,125	2	2	31	3,075	1,250	63
	Gasoline Generator Totals		11		4,000	38,850	37	31	573	56,224	22,854	1,145
Emission Factors from AP-42, Chapter 3.4-1 for generators rated less than 448 kW, S=.05 Formula = Output (kW-hr/yr) * 1.34 (hp/kW) * Emission Factor (lb/hp-hr)							7.10E-04	5.91 E-04	1.10E-02	1.08E+00	4.39E-01	2.20E-02
						Park Totals (Ibs/yr)	41	67	667	56,224	22,877	1,150
						Park Totals (tons/yr)	0.02	0.03	0.33	28.11	11.44	0.58

TANKS 4.0
Emissions Report - Summary Format
Tank Identification and Physical Characteristics

Identification

User Identification:	Guadalupe Mountains NP
City:	El Paso
State:	Texas
Company:	NPS
Type of Tank:	Horizontal Tank
Description:	2,000 gallon white AST

Tank Dimensions

Shell Length (ft):	12.00
Diameter (ft):	5.50
Volume (gallons):	2,000.00
Turnovers:	0.00
Net Throughput (gal/yr):	5,000.00
Is Tank Heated (yin):	N
Is Tank Underground (y/n):	N

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition:	Good

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig):	0.03

Meteorological Data used in Emissions Calculations: El Paso, Texas (Avg Atmospheric Pressure = 12.79 psia)

TANKS 4.0
Emissions Report - Summary Format
Liquid Contents of Storage Tank

Mixture/Component	Month	Daily Liquid Surf. Temperatures (deg F) Avg.	Min.	Max.	Liquid Bulk Temp. (deg F)	Vapor Pressures (psia) Avg.	Min.	Max.	Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mot. Weight	Basis for Vapor Pressure Calculations
Gasoline (RVP 8)	All	65.66	58.37	72.96	63.23	4.5235	3.9140	5.2073	68.0000			92.00	Option 4: RVP=8, ASTM Slope=3

TANKS 4.0
Emissions Report - Summary Format
Individual Tank Emission Totals

Annual Emissions Report

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Gasoline (RVP 8)	36.62	446.21	482.83

TANKS 4.0
Emissions Report - Summary Format
Tank Identification and Physical Characteristics

Identification

User Identification:	Guadalupe Mountains NP2
City:	El Paso
State:	Texas
Company:	NPS
Type of Tank:	Horizontal Tank
Description:	!000 gallon white AST

Tank Dimensions

Shell Length (ft):	10.75
Diameter (ft):	4.00
Volume (gallons):	1,000.00
Turnovers:	0.00
Net Throughput (gai/yr):	17,000.00
Is Tank Heated (yin):	N
Is Tank Underground (y/n):	N

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition:	Good

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig):	0.03

Meteorological Data used in Emissions Calculations: El Paso, Texas (Avg Atmospheric Pressure = 12.79 psia)

TANKS 4.0
Emissions Report - Summary Format
Liquid Contents of Storage Tank

Mixture/Component	Month	Daily Liquid Surf. Temperatures (deg F) Avg.	Min.	Max.	Liquid Bulk Temp. (deg F)	Vapor Pressures (psia) Avg	Min.	Max.	Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Gasoline (RVP 8)	All	65.66	58.37	72.96	63.23	4.5235	3.9140	5.2073	68.0000			92.00	Option 4: RVP=8, ASTM Slope=3

TANKS 4.0
Emissions Report - Summary Format
Individual Tank Emission Totals

Annual Emissions Report

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Gasoline (RVP 8)	124.50	237.12	361.63

TITLE: Results of FOFEM model execution on date: 1/23/2003

FUEL CONSUMPTION CALCULATIONS

Region: Interior West
Cover Type: SAF/SRM - SRM 612 - Sagebrush - Grass
Fuel Type: Natural
Fuel Reference: FOFEM 461

FUEL CONSUMPTION TABLE

Fuel Component Name	Preburn Load (t/acre)	Consumed Load **(t/acre)**	Postburn Load (t/acre)	Percent Reduced (%)	Equation Reference Number	Moisture
Litter	0.07	0.07	0.00	100.0	999	
Wood (0-1/4 inch)	0.00	0.00	0.00	0.0	**999**	
Wood (1/4-1 inch)	0.00	0.00	0.00	0.0	**999**	25.0
Wood (1-3 inch)	0.00	0.00	0.00	0.0	**999**	
Wood (3+ inch) Sound	0.00	0.00	0.00	0.0	**999**	20.0
3->6	0.00	0.00	0.00	0.0		
6->9	0.00	0.00	0.00	0.0		
9->20	0.00	0.00	0.00	0:0		
20->	0.00	0.00	0.00	0.0		
Wood (3+ inch) Rotten	0.00	0.00	0.00	0.0	999	20.0
3->6	0.00	0.00	0.00	0.0.;		
6->9	0.00	0.00	0.00	0:0		
9->20	0.00	0.00	0.00	0.0		
20->	0.00	0.00	0.00	0.0		
Duff	0.00	0.00	0.00	0.0	2	100.0
Herbaceous	0.45	0.45	0.00	100.0	22	
Shrubs	1.26	0.63	0.63	50.0	232	
Crown foliage	0.00	0.00	0.00	0.0	37	
Crown branchwood	0.00	0.00	0.00	0.0	38	
Total Fuels	1.78	1.15	0.63	64.6		

FIRE EFFECTS ON FOREST FLOOR COMPONENTS

Forest Floor Component	Preburn Condition	Amount Consumed	Postburn Condition	Percent Reduced	Equation Number
Duff Depth (in)	0.0	0.0	0.0	0.0	6
Min Soil Exp (%)	.0	21.9	21.9	21.9	10

	Emissions -- lbs/acre flaming	smoldering	total
PM 10	7	4	11
PM 2.5	6	3	9
CH 4	2	2	4
CO	14	42	56
CO 2	3841	172	4013

	Consumption tons/acre	Duration hour:min:sec
Flaming:	1.08	00:01:00
Smoldering:	0.07	00:01:00
Total:	1.15	

TITLE: Results of FOFEM model execution on date: 1/27/2003

FUEL CONSUMPTION CALCULATIONS

Region: Interior West
Cover Type: SAF/SRM - SRM 734 - Mesquite - Oak
Fuel Type: Natural
Fuel Reference: FOFEM 371

FUEL CONSUMPTION TABLE

Fuel Component Name	Preburn Load (t/acre)	Consumed Load (t/acre)	Postburn Load (t/acre)	Percent Reduced (%)	Equation Reference Number	Moisture
Litter	0.20	0.20	0.00	100.0	999	
Wood (0-1/4 inch)	0.00	0.00	0.00	0.0	999	
Wood (1/4-1 inch)	0.00	0.00	0.00	0.0	999	25.0
Wood (1-3 inch)	0.00	0.00	0.00	0.0	999	
Wood (3+ inch) Sound	0.00	0.00	0.00	0.0	999	20.0
3->6	0.00	0.00	0.00	0.0		
6->9	0.00	0.00	0.00	0.0		
9->20	0.00	0.00	0.00	0.0		
20->	0.00	0.00	0.00	0.0		
Wood (3+ inch) Rotten	0.00	0.00	0.00	0.0	999	20.0
3->6	0.00	0.00	0.00	0.0		
6->9	0.00	0.00	0.00	0.0		
9->20	0.00	0.00	0.00	0.0		
20->	0.00	0.00	0.00	0.0		
Duff:	0.00	0.00	0.00	0.0	2	100.0
Herbaceous	1.00	1.00	0.00	100.0	22	
Shrubs	5.00	3.00	2.00	60.0	23	
Crown foliage	0.00	0.00	0.00	0.0	37	
Crown branchwood	0.00	0.00	0.00	0.0	38	
Total Fuels	6.20	4.20	2.00	67.7		

FIRE EFFECTS ON FOREST FLOOR COMPONENTS

Forest Floor Component	Preburn Condition	Amount Consumed	Postburn Condition	Percent Reduced	Equation Number
Duff Depth (in)	0.0	0.0	0.0	0.0	6
Min Soil Exp (%)	.0	21.9	21.9	21.9	10

	Emissions -- lbs/acre flaming	smoldering	total
PM 10	25	11	36
PM 2.5	21	9	30
CH 4	6	6	12
CO	52	121	173
CO 2	14228	491	14719

	Consumption tons/acre	Duration hour:min:sec
Flaming:	4.00	00:01:00
Smoldering:	0.20	00:01:00
Total:	4.20	

2001 PRESCRIBED FIRE EMISSIONS AT GUADALUPE MOUNTAINS NATIONAL PARK

Type	Fuel Type	Acres	PKo (Ibs/yr)	$PM_{2.5}$ (lbs/yr)	CH_4 (lbs/yr)	CO (lbs/yr)	CO_2 (Ibs/yr)
Prescribed Fires	Sagebrush- Grass	67	737	603	268	3,752	268,871
	Mesquite Oak	68	2,448	2,040	816	11,764	1,000,892
Totals	lbs/yr	135	3,185	2,643	1,084	15,516	1,269,763
	tons/yr		1.59	1.32	0.54	7.76	634.88
Wildland Fires	Sagebrush- Grass	800	8,800	7,200	3,200	44,800	3,210,400
	Mesquite Oak	800	28,800	24,000	9,600	138,400	11,775,200
Totals	lbs/yr	1,600	37,600	31,200	12,800	183,200	14,985,600
	tons/yr		18.80	15.60	6.40	91.60	7,492.80
All Fire Totals		1,735	40,785	33,843	13,884	198,716	16,255,363
					tons/yr		
			20.39	16.92	6.94	99.36	8,127.68

	Emission Factors (lbs/acre)				
	PM_{10} (Ibs/acre)	$PM_{2.5}$ (lbs/acre)	CH_4 (lbs/acre)	CO (lbs/acre)	CO_2 (lbs/acre)
Sagebrush- Grass	11	9	4	56	4,013
Mesquite Oak	36	30	12	173	14,719

```
* ####################################
* Guadelupe M NP Winter Conditions.
* File 1, Run 1, Scenario 29.
* # # # # # # # # # # # # # # # # # # # # # # # # # # #
  M584 Warning:
             The user supplied area wide average speed of 35.0
             will be used for all hours of the day. 1000 of VMT
             has been assigned to a fixed combination of freeways,
             freeway ramps, arterial/collector and local roadways
             for all hours of the day and all vehicle types.

* Reading PM Gas Carbon ZML Levels
* from the external data file PMGZML.CSV

* Reading PM Gas Carbon DR1 Levels
* from the external data file PMGDR1.CSV

* Reading PM Gas Carbon DR2 Levels
* from the external data file PMGDR2.CSV

* Reading PM Diesel Zero Mile Levels
* from the external data file PMDZML.CSV

* Reading the First PM Deterioration Rates
* from the external data file PMDDR1.CSV

* Reading the Second PM Deterioration Rates
* from the external data file PMDDR2.CSV

          User supplied gasoline sulfur content = 300.0 ppm.

  M616 Comment:
               User has supplied post-1999 sulfur levels.
  M 48 Warning:
              there are no sales for vehicle class HDGV8b

                    Calendar Year:   2001
                            Month:   Jan.
                         Altitude:   High
              Minimum Temperature:   30.0 (F)
```

Maximum Temperature:	56.0 (F)
Absolute Humidity:	75. grains/lb
Nominal Fuel RVP:	11.8 psi
Weathered RVP:	11.8 psi
Fuel Sulfur Content:	299. ppm
Exhaust I/M Program:	No
Evap I/M Program:	No
ATP Program:	No
Reformulated Gas:	No

Vehicle Type:	LDGV	LDGT12	LDGT34	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
GVWR:		<6000	>6000	(All)						
VMT Distribution:	0.7002	0.1410	0.1044		0.0060	0.0008	0.0016	0.0180	0.0280	1.0000
Composite Emission Factors (g/mi):										
Composite VOC :	0.835	1.055	0.953	1.012	0.942	0.433	0.439	0.509	2.63	0.922
Composite CO	16.59	21.74	19.73	20.88	26.99	1.308	0.931	6.582	24.22	17.702
Composite NOX :	0.796	1.141	1.333	1.222	3.729	1.267	1.212	16.834	1.12	1.218

Veh. Type:	LDGT1	LDGT2	LDGT3	LDGT4	LDDT12	LDDT34
VMT Mix:	0.0330	0.1080	0.0719	0.0325	0.0000	0.0016
Composite Emission Factors (g/mi):						
Composite VOC :	0.994	1.074	0.929	1.005	2.424	0.391
Composite CO	20.98	21.97	19.61	19.98	6.522	0.795
Composite NOX :	0.896	1.215	1.203	1.619	2.555	1.180

Veh. Type:	HDGV2B	HDGV3	HDGV4	HDGV5	HDGV6	HDGV7	HDGV8A	HDGV8B
VMT Mix:	0.0060	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Composite Emission Factors (g/mi):								
Composite VOC :	0.942	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Composite CO	26.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Composite NOX :	3.729	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Veh. Type:	HDDV2B	HDDV3	HDDV4	HDDV5	HDDV6	HDDV7	HDDV8A	HDDV8E

VMT Mix:	0.0020	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Composite Emission Factors (g/mi):

Composite VOC :	0.378	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Composite CO	1.942	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Composite NOX :	4.150	0.000	0.000	0.000	0.000	0.000	0.000	0.000

```
* # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
* Guadelupe M NP Summer Conditions.
* File 1, Run 1, Scenario 30.
* # # # # # # # # # # # # # # # # # # # # # # # # # # # # #
  M584 Warning:
            The user supplied area wide average speed of 35.0
            will be used for all hours of the day. 100% of VMT
            has been assigned to a fixed combination of freeways,
            freeway ramps, arterial/collector and local roadways
            for all hours of the day and all vehicle types.

* Reading PM Gas Carbon ZML Levels
* from the external data file PMGZML.CSV

* Reading PM Gas Carbon DR1 Levels
* from the external data file PMGDR1.CSV

* Reading PM Gas Carbon DR2 Levels
* from the external data file PMGDR2.CSV

* Reading PM Diesel Zero Mile Levels
* from the external data file PMDZML.CSV

* Reading the First PM Deterioration Rates
* from the external data file PMDDR1.CSV

* Reading the Second PM Deterioration Rates
* from the external data file PMDDR2.CSV

          User supplied gasoline sulfur content = 300.0 ppm.

  M616 Comment:
               User has supplied post-1999 sulfur levels.
```

M 48 Warning:
there are no sales for vehicle class HDGV8b

Calendar Year:	2001	
Month:	July	
Altitude:	High	
Minimum Temperature:	60.0	(F)
Maximum Temperature:	89.0	(F)
Absolute Humidity:	75.	grains/lb
Nominal Fuel RVP:	8.0	psi
Weathered RVP:	7.8	psi
Fuel Sulfur Content:	299.	ppm
Exhaust I/M Program:	No	
Evap I/M Program:	No	
ATP Program:	No	
Reformulated Gas:	No	

Vehicle Type:	LDGV	LDGT12	LDGT34	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
GVWR:		<6000	>6000	(All)						
VMT Distribution:	0.7002	0.1410	0.1044		0.0060	0.0008	0.0016	0.0180	0.0280	1.0000
Composite Emission Factors (g/mi):										
Composite VOC :	0.705	0.859	0.855	0.857	0.806	0.405	0.461	0.490	3.11	0.806
Composite CO	11.70	14.38	14.11	14.27	21.59	1.277	0.945	6.500	24.55	12.632
Composite NOX :	0.745	1.010	1.279	1.124	3.631	1.170	1.239	16.586	0.92	1.147

Veh. Type:	LDGT1	LDGT2	LDGT3	LDGT4	LDDT12	LDDT34
VMT Mix:	0.0330	0.1080	0.0719	0.0325	0.0000	0.0016
Composite Emission Factors (g/mi):						
Composite VOC :	0.819	0.871	0.837	0.894	2.512	0.418
Composite CO	13.99	14.50	14.02	14.30	6.775	0.824
Composite NOX :	0.801	1.073	1.153	1.558	2.574	1.212

Veh. Type:	HDGV2B	HDGV3	HDGV4	HDGV5	HDGV6	HDGV7	HDGV8A	HDGV8B
VMT Mix:	0.0060	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Composite Emission Factors (g/mi):

Composite VOC :	0.806	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Composite CO	21.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Composite NOX :	3.631	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Veh. Type:	HDDV2B	HDDV3	HDDV4	HDDV5	HDDV6	HDDV7	HDDV8A	HDDV8B
VMT Mix:	0.0020	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Composite Emission Factors (g/mi):

Composite VOC :	0.374	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Composite CO	1.957	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Composite NOX :	4.078	0.000	0.000	0.000	0.000	0.000	0.000	0.000

# #
Guadelupe M NP Winter Conditions.
File 1, Run 1, Scenario 29.
# #

Calendar Year: 2001
Month: Jan.
Gasoline Fuel Sulfur Content: 299. ppm
Diesel Fuel Sulfur Content: 500. ppm
Particle Size Cutoff: 10.00 Microns
Reformulated Gas: No

Vehicle Type:	LDGV	LDGT12	LDGT34	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
GVWR:		<6000	>6000	(All)						
VMT Distribution:	0.7002	0.1410	0.1044		0.0060	0.0008	0.0016	0.0180	0.0280	1.0000
Composite Emission Factors (g/mi):										
Lead:	0.0000	0.0000	0.0000	0.0000	0.0000	------	------	------	0.0000	0.0000
GASPM:	0.0042	0.0047	0.0044	0.0046	0.0523	------	------	------	0.0205	0.0050
ECARBON:	------	------	------	------	------	0.1244	0.0488	0.1250	------	0.0024
OCARBON:	------	------	------	------	------	0.0351	0.0703	0.0997	------	0.0019
SO4:	0.0028	0.0049	0.0047	0.0048	0.0118	0.0049	0.0106	0.0540	0.0010	0.0043
Total Exhaust PM:	0.0071	0.0096	0.0091	0.0094	0.0640	0.1644	0.1297	0.2786	0.0215	0.0136
Brake:	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125
Tire:	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0115	0.0040	0.0080
Total PM:	0.0276	0.0302	0.0297	0.0300	0.0846	0.1849	0.1503	0.3027	0.0380	0.0341
SO2:	0.0684	0.0804	0.1134	0.0944	0.1603	0.0939	0.2028	0.7715	0.0328	0.0872
NH3:	0.1016	0.1005	0.1015	0.1009	0.0451	0.0068	0.0068	0.0270	0.0113	0.0970
Idle Emissions (g/hr)										
PM Idle:	------	------	------	------	------	------	------	1.0557	------	0.0190

Veh. Type:	LDGT1	LDGT2	LDGT3	LDGT4	LDDT12	LDDT34
VMT Mix:	0.0330	0.1080	0.0719	0.0325	0.0000	0.0016
Composite Emission Factors (g/mi):						
Lead:	0.0000	0.0000	0.0000	0.0000	------	------
GASPM:	0.0047	0.0047	0.0044	0.0044	------	------
ECARBON:	------	------	------	------	0.1498	0.0464
OCARBON:	------	------	------	------	0.2156	0.0668

SO4:	0.0049	0.0049	0.0047	0.0047	0.0062	0.0107
Total Exhaust PM:	0.0096	0.0096	0.0091	0.0091	0.3717	0.1238
Brake:	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125
Tire:	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080
Total PM:	0.0302	0.0302	0.0297	0.0297	0.3922	0.1444
SO2:	0.0804	0.0804	0.1134	0.1134	0.1196	0.2049
NH3:	0.1005	0.1005	0.1015	0.1015	0.0068	0.0068
Idle Emissions (g/hr)						
PM Idle:	------	------	------	------	------	------

Veh. Type:	HDGV2B	HDGV3	HDGV4	HDGV5	HDGV6	HDGV7	HDGV8A	HDGV8B
VMT Mix:	0.0060	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Composite Emission Factors (g/mi):								
Lead:	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GASPM:	0.0523	0.0523	0.0503	0.0504	0.0503	0.0503	0.0503	0.0000
ECARBON:	------	------	------	------	------	------	------	------
OCARBON:	------	------	------	------	------	------		
SO4:	0.0118	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total Exhaust PM:	0.0640	0.0523	0.0503	0.0504	0.0503	0.0503	0.0503	0.0000
Brake:	0.0125	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Tire:	0.0080	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total PM:	0.0846	0.0523	0.0503	0.0504	0.0503	0.0503	0.0503	0.0000
SO2:	0.1603	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NH3:	0.0451	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Idle Emissions (g/hr)								
PM Idle:	------	------	------	------	------	------	------	------

Veh. Type:	HDDV2B	HDDV3	HDDV4	HDDV5	HDDV6	HDDV7	HDDV8A	HDDV8B
VMT Mix:	0.0020	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Composite Emission Factors (g/mi):								
Lead:	------							
GASPM:	------	------	------	------	------	------		
ECARBON:	0.0514	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
OCARBON:	0.0535	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SO4:	0.0172	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total Exhaust PM:	0.1221	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Brake:	0.0125	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Tire:	0.0080	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Total PM:	0.1426	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SO2:	0.2452	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NH3:	0.0270	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Idle Emissions (g/hr)								
PM Idle:	1.0617	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

If # If # # # #

E Guadelupe M NP Summer Conditions.
File 1, Run 1, Scenario 30.
If # If # # # # #

Calendar Year: 2001
Month: July
Gasoline Fuel Sulfur Content: 299. ppm
Diesel Fuel Sulfur Content: 500. ppm
Particle Size Cutoff: 10.00 Microns
Reformulated Gas: No

Vehicle Type:	LDGV	LDGT12	LDGT34	LDGT	HDGV	LDDV	LDDT	HDDV	MC	All Veh
GVWR:		<6000	>6000	(All)						
VMT Distribution:	0.7002	0.1410	0.1044		0.0060	0.0008	0.0016	0.0180	0.0280	1.0000
Composite Emission Factors (g/mi):										
Lead:	0.0000	0.0000	0.0000	0.0000	0.0000	------	------	------	0.0000	0.0000
GASPM:	0.0042	0.0046	0.0044	0.0045	0.0523	------	------	------	0.0205	0.0050
ECARBON:	------	------	------	------	------	0.1192	0.0485	0.1160	------	0.0023
OCARBON:	------	------	------	------	------	0.0336	0.0698	0.0926	------	0.0018
SO4:	0.0028	0.0049	0.0047	0.0048	0.0120	0.0049	0.0106	0.0540	0.0010	0.0042
Total Exhaust PM:	0.0070	0.0095	0.0091	0.0093	0.0643	0.1576	0.1289	0.2626	0.0215	0.0133
Brake:	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125
Tire:	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080	0.0116	0.0040	0.0080
Total PM:	0.0276	0.0300	0.0297	0.0299	0.0848	0.1782	0.1494	0.2867	0.0380	0.0338
SO2:	0.0684	0.0804	0.1134	0.0944	0.1601	0.0929	0.2031	0.7714	0.0328	0.0872
NH3:	0.1016	0.1007	0.1015	0.1010	0.0451	0.0068	0.0068	0.0270	0.0113	0.0970
Idle Emissions (g/hr)										
PM Idle:	------	------	------	------	------	------	------	1.0472	------	0.0189

Veh. Type:	LDGT1	LDGT2	LDGT3	LDGT4	LDDT12	LDDT34
VMT Mix:	0.0330	0.1080	0.0719	0.0325	0.0000	0.0016

Composite Emission Factors (g/mi):								
Lead:	0.0000	0.0000	0.0000	0.0000	------	------		
GASPM:	0.0046	0.0046	0.0044	0.0044	------	------		
ECARBON:	------	------	------	------	0.1498	0.0464		
OCARBON:	------	------	------	------	0.2156	0.0668		
SO4:	0.0049	0.0049	0.0047	0.0047	0.0062	0.0107		
Total Exhaust PM:	0.0095	0.0095	0.0091	0.0091	0.3717	0.1238		
Brake:	0.0125	0.0125	0.0125	0.0125	0.0125	0.0125		
Tire:	0.0080	0.0080	0.0080	0.0080	0.0080	0.0080		
Total PM:	0.0300	0.0300	0.0297	0.0297	0.3922	0.1444		
SO2:	0.0804	0.0804	0.1134	0.1134	0.1196	0.2049		
NH3:	0.1007	0.1007	0.1015	0.1015	0.0068	0.0068		
Idle Emissions (g/hr)								
PM Idle:	------	------	------	------	------	------		

Veh. Type:	HDGV2B	HDGV3	HDGV4	HDGV5	HDGV6	HDGV7	HDGV8A	HDGV8B
VMT Mix:	0.0060	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Composite Emission Factors (g/mi):								
Lead:	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
GASPM:	0.0523	0.0523	0.0506	0.0506	0.0506	0.0506	0.0505	0.0000
ECARBON:	------	------	------	------	------	------	-----	
OCARBON:	------	------	------	------	------	-----		
SO4:	0.0120	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total Exhaust PM:	0.0643	0.0523	0.0506	0.0506	0.0506	0.0506	0.0505	0.0000
Brake:	0.0125	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Tire:	0.0080	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total PM:	0.0848	0.0523	0.0506	0.0506	0.0506	0.0506	0.0505	0.0000
SO2:	0.1601	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NH3:	0.0451	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Idle Emissions (g/hr)								
PM Idle:	------	------	------	------	------	------	_____	

Type:	HDDV2B	HDDV3	HDDV4	HDDV5	HDDV6	HDDV7	HDDV8A	HDDV8B
			------	------	------	------	------	
VMT Mix:	0.0020	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Composite Emission Factors (g/mi) :								
Lead:	- - - - - - - - - - -	------	----	------	------	------	------	
GASPM:	- - - - - - - - - - -	------	------	------	-----			

ECARBON:	0.0503	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
OCARBON:	0.0523	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SO4:	0.0171	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total Exhaust PM:	0.1198	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Brake:	0.0125	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Tire:	0.0080	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total PM:	0.1403	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
SO2:	0.2450	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NH3:	0.0270	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Idle Emissions (g/hr)								
PM Idle:	1.0504	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

GUADALUPE MOUNTAINS NATIONAL PARK VISITOR VEHICLE EMISSIONS

Paved Road Annual VMT	Unpaved Road Annual VMT
108,500	20,155

Emission Factors (glmi) - All Vehicles

				PM_{10} (Paved)			PM_{10} (Unpaved)		
	NOx	CO	VOC	Exhaust, Brake, and Tire	Fugitive	Total	Exhaust, Brake, and Tire	Fugitive	Total
Summer	4.690	12.181	0.819	0.0938	0.84	0.9338	0.0938	271.25	271.3438
Winter	4.921	16.840	0.934	0.0950	0.84	0.9350	0.0950	271.25	271.3450
Average	4.806	14.511	0.877			0.934			271.344

Emissions (tonslyr) - All Vehicles

NOx	CO	VOC	Paved PM_{10}	Unpaved PM_{10}	Total PM_{10}
0.57	1.73	0.10	0.11	6.02	6.13

Emissions (lbslyr) - All Vehicles

NOx	CO	VOC	Paved PM_{10}	Unpaved PM_{10}	Total PM_{10}
1,147	3,464	209	223	12,032	12,255

GUADALUPE MOUNTAINS NATIONAL PARK NPS AND **GSA VEHICLES**

	LDGV	LDGT	HDGV	HDDV	Total
Total Miles	30,130	163,315	31,448	21,813	246,706

Emission Factors (glmi) - LDGV

	NOx	CO	VOC	PM10 Exhaust, Brake, and Tire	PM10 Fugitive	PM10 Total
Summer	0.7430	11.6200	0.6980	0.0276	0.8400	0.8676
Winter	0.7930	16.5000	0.8260	0.0276	0.8400	0.8676
Average	0.7680	14.0600	0.7620			0.8676

Emissions (tonslyr) - **LDGV**

NOx	CO	**VOC**	PM10
0.03	0.47	0.03	0.03

Emission **Factors** (glmi) - LDGT

	NOx	CO	VOC	PM,o Exhaust, Brake, and Tire	PM,o Fugitive	PM,o Total
Summer	1.096	14.290	0.857	0.030	0.840	0.870
Winter	1.203	21.090	1.022	0.030	0.840	0.870
Average	1.150	17.690	0.940			0.870

Emissions (tonslyr) - LDGT

NOx	CO	VOC	PM,o
0.21	3.18	0.17	0.16

Emission Factors (glmi) - HDGV

	NOx	CO	VOC	PM,o Exhaust, Brake, and Tire	PM,o Fugitive	PM,o Total
Summer	3.679	22.230	0.829	0.085	0.840	0.925
Winter	3.786	27.810	0.967	0.084	0.840	0.924
Average	3.733	25.020	0.898			0.924

Emissions (tonslyr) - HDGV

NOx	CO	VOC	PM10
0.13	0.87	0.03	0.03

Emission Factors (glmi) - HDDV

	NOx	CO	VOC	PM.o Exhaust, Brake, and Tire	PM.o Fugitive	PM.o Total
Summer	14.245	4.397	0.806	0.261	0.840	1.101
Winter	14.858	4.431	0.810	0.261	0.840	1.101
Average	14.552	4.414	0.808			1.101

Emissions (tonslyr) - HDDV

NOx	CO	VOC	PM~o
0.35	0.11	0.02	0.03

Emissions (tonslyr) - Total

NOx	CO	VOC	PM,,,
0.71	4.62	0.24	0.24

Emissions (lbslyr) - Total

NOx	CO	VOC	PM,o
1,420	9,231	489	487

2001 GUADALUPE MOUNTAINS NP NONROAD VEHICLE EMISSIONS

		Emission Factors (gm/hp-hr)							Emissions (lbs/yr)			
Vehicle	No.	PM	Nox	CO	VOC	hp	load	hrs/yr	PM	NOx	CO	VOC
Utility Vehicle	2	2.04	1.03	2.31	2.19	15	0.55	200	7.4	3.7	8.4	7.9
Tractors	1	2.04	1.03	2.31	2.19	42.35	0.68	350	45.2	22.8	51.2	48.6
Backhoe	1	2.04	1.03	2.31	2.19	77	0.55	50	9.5	0.0 4.8	0.0 10.8	10.2
Riding Mower	1	1.11	10.3	4.8	1.3	15	0.55	100	2.0	18.7	8.7	2.4
Grader	1	1.06	9.6	3.8	1.43	172	0.61	145	35.5	321.3	127.2	47.9
Sweeper	1	1.7	14	6.06	1.46	30	0.68	25	1.9	15.7	6.8	1.6
Forklift	2	1.06	9.6	3.8	1.43	172	0.61	100	24.5	221.6	87.7	33.0
Front End Loader	1	1.11	10.3	4.8	1.3	77	0.55	725	74.98	695.75	324.23	87.81
ATV	4	2.04	1.03	2.31	2.19	15	0.55	50	1.1	0.6	1.3	1.2
							Totals:	(lbs/yr)	202	1,305	626	241
								(tons/yr)	0.10	0.65	0.31	0.12

APPENDIX C

PUBLIC USE DATA

GUADALUPE MOUNTAINS NP

Report Date: December 2002

Recreation Visits	This Month	Same Month Last Year	% Change	This Year YTD	Last Year YTD	% Change YTD
Frijole	531	576	-8.0	21,800	17,263	26.3
McKittrick Canyon	1,731	1,742	-0.6	30,380	37,603	-19.2
Pine Springs	8,543	9,404	-9.2	143,843	159,489	-9.8
Dog Canyon	25	290	-91.4	6,888	7,950	-13.4
Total Recreation Visits	10,829	12,012	-9.9	202,911	222,306	-8.7
Williams Ranch	331	52	-36.5	917	969	-5.4
Pine Springs Visitor Center	2,610	1,454	79.5	63,748	72,064	-11.5

APPENDIX D

SELECTED TEXAS AIR QUALITY REGULATIONS

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TITLE 30	ENVIRONMENTAL QUALITY
PART 1	TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
CHAPTER 106	PERMITS BY RULE
SUBCHAPTER G	COMBUSTION
RULE §106.183	**Boilers, Heaters, and Other Combustion Devices**

Boilers, heaters, drying or curing ovens, furnaces, or other combustion units, but not including stationary internal combustion engines or turbines are permitted by rule, provided that the following conditions are met.

(1) The only emissions shall be products of combustion of the fuel.

(2) The maximum heat input shall be 40 million British thermal unit (Btu) per hour with the fuel being:

(A) sweet natural gas;

(B) liquid petroleum gas;

(C) fuel gas containing no more than 0.1 grain of total sulfur compounds, calculated as sulfur, per dry standard cubic foot; or

(D) combinations of the fuels in subparagraphs (A) - (C) of this paragraph.

(3) Distillate fuel oil shall be fired as a backup fuel only. Firing shall be limited to 720 hours per year. The fuel oil shall contain less than 0.3% sulfur by weight and shall not be blended with waste oils or solvents.

(4) All gas fired heaters and boilers with a heat input greater than ten million Btu per hour (higher heating value) shall be designed such that the emissions of nitrogen oxides shall not exceed 0.1 pounds per million Btu heat input.

(5) Records of hours of fuel oil firing and fuel oil purchases shall be maintained on-site on a two-year rolling retention period and made available upon request to the commission or any local air pollution control agency having jurisdiction.

Source Note: The provisions of this §106.183 adopted to be effective June 18, 1997, 22 TexReg 5668; amended to be effective September 4, 2000, 25 TexReg 8653

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TITLE 30	ENVIRONMENTAL QUALITY
PART 1	TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
CHAPTER 106	PERMITS BY RULE
SUBCHAPTER W	TURBINES AND ENGINES
RULE §106.512	**Stationary Engines and Turbines**

Gas or liquid fuel-fired stationary internal combustion reciprocating engines or gas turbines that operate in compliance with the following conditions of this section are permitted by rule.

(1) The facility shall be registered by submitting the commission's Form PI-7, Table 29 for each proposed reciprocating engine, and Table 31 for each proposed gas turbine to the commission's Office of Permitting, Remediation, and Registration in Austin within ten days after construction begins. Engines and turbines rated less than 240 horsepower (hp) need not be registered, but must meet paragraphs (5) and (6) of this section, relating to fuel and protection of air quality. Engine hp rating shall be based on the engine manufacturer's maximum continuous load rating at the lesser of the engine or driven equipment's maximum published continuous speed. A rich-burn engine is a gas-fired spark-ignited engine that is operated with an exhaust oxygen content less than 4.0% by volume. A lean-burn engine is a gas-fired spark-ignited engine that is operated with an exhaust oxygen content of 4.0% by volume, or greater.

(2) For any engine rated 500 hp or greater, subparagraphs (A) - (C) of this paragraph shall apply.

(A) The emissions of nitrogen oxides (NO_x) shall not exceed the following limits:

(i) 2.0 grams per horsepower-hour (g/hp-hr) under all operating conditions for any gas-fired rich-burn engine;

(ii) 2.0 g/hp-hr at manufacturer's rated full load and speed, and other operating conditions, except 5.0 g/hp-hr under reduced speed, 80-100% of full torque conditions, for any spark-ignited, gas-fired lean-burn engine, or any compression-ignited dual fuel-fired engine manufactured new after June 18, 1992;

(iii) 5.0 g/hp-hr under all operating conditions for any spark-ignited, gas-fired, lean-burn two-cycle or four-cycle engine or any compression-ignited dual fuel-fired engine rated 825 hp or greater and manufactured after September 23, 1982, but prior to June 18, 1992;

(iv) 5.0 g/hp-hr at manufacturer's rated full load and speed and other operating conditions, except 8.0 g/hp-hr under reduced speed, 80-100% of full torque conditions for any spark-ignited, gas-fired, lean-burn four-cycle engine, or any compression-ignited dual fuel-fired engine that:

(I) was manufactured prior to June 18, 1992, and is rated less than 825 hp; or

(II) was manufactured prior to September 23, 1982;

(v) 8.0 g/hp-hr under all operating conditions for any spark-ignited, gas-fired, two-cycle lean-burn engine that:

(I) was manufactured prior to June 18, 1992, and is rated less than 825 hp; or

(II) was manufactured prior to September 23, 1982;

(vi) 11.0 g/hp-hr for any compression-ignited liquid-fired engine.

(B) For such engines which are spark-ignited gas-fired or compression-ignited dual fuel-fired, the engine shall be equipped as necessary with an automatic air-fuel ratio (AFR) controller which maintains AFR in the range required to meet the emission limits of subparagraph (A) of this paragraph. An AFR controller shall be deemed necessary for any engine controlled with a non-selective catalytic reduction (NSCR) converter and for applications where the fuel heating value varies more than ± 50 British theunal unit/standard cubic feet from the design lower heating value of the fuel. If an NSCR converter is used to reduce NO_R , the automatic controller shall operate on exhaust oxygen control.

(C) Records shall be created and maintained by the owner or operator for a period of at least two years, made available, upon request, to the commission and any local air pollution control agency having jurisdiction, and shall include the following:

(i) documentation for each AFR controller, manufacturer's, or supplier's recommended maintenance that has been performed, including replacement of the oxygen sensor as necessary for oxygen sensor-based controllers. The oxygen sensor shall be replaced at least quarterly in the absence of a specific written recommendation;

(ii) documentation on proper operation of the engine by recorded measurements of NO_x and carbon monoxide (CO) emissions as soon as practicable, but no later than seven days following each occurrence of engine maintenance which may reasonably be expected to increase emissions, changes of fuel quality in engines without oxygen sensor-based AFR controllers which may reasonably be expected to increase emissions, oxygen sensor replacement, or catalyst cleaning or catalyst replacement. Stain tube indicators specifically designed to measure NO_x and CO concentrations shall be acceptable for this documentation, provided a hot air probe or equivalent device is used to prevent error due to high stack temperature, and three sets of concentration measurements are made and averaged. Portable NO_x and CO analyzers shall also be acceptable for this documentation;

(iii) documentation within 60 days following initial engine start-up and biennially thereafter, for emissions of NO_x and CO, measured in accordance with United States Environmental Protection Agency (EPA) Reference Method 7E or 20 for NO_x and Method 10 for CO. Exhaust flow rate may be determined from measured fuel flow rate and EPA Method 19. California Air Resources Board Method A-100 (adopted June 29, 1983) is an acceptable alternate to EPA test methods. Modifications to these methods will be subject to the prior approval of the Source and Mobile Monitoring Division of the commission. Emissions shall be measured and recorded in the as-found operating condition; however, compliance determinations shall not be established during start-up, shutdown, or under breakdown conditions. An owner or operator may submit to the appropriate regional office a report of a valid emissions test performed in Texas, on the same engine, conducted no more than 12 months prior to the most recent start of construction date, in lieu of performing an emissions test within 60 days following engine start-up at the new site. Any such engine shall be sampled no less frequently than biennially (or every 15,000 hours of elapsed run time, as recorded by an elapsed run time meter) and upon request of the executive director. Following the initial compliance test, in lieu of performing stack sampling on a biennial calendar basis, an owner or operator may elect to install and operate an elapsed operating time

meter and shall test the engine within 15,000 hours of engine operation after the previous emission test. The owner or operator who elects to test on an operating hour schedule shall submit in writing, to the appropriate regional office, biennially after initial sampling, documentation of the actual recorded hours of engine operation since the previous emission test, and an estimate of the date of the next required sampling.

(3) For any gas turbine rated 500 hp or more, subparagraphs (A) and (B) of this paragraph shall apply.

(A) The emissions of NO_X shall not exceed 3.0 g/hp-hr for gas-firing.

(B) The turbine shall meet all applicable NO_x and sulfur dioxide (SO_2) (or fuel sulfur) emissions limitations, monitoring requirements, and reporting requirements of EPA New Source Performance Standards Subpart GG--Standards of Performance for Stationary Gas Turbines. Turbine hp rating shall be based on turbine base load, fuel lower heating value, and International Standards Organization Standard Day Conditions of 59 degrees Fahrenheit, 1.0 atmosphere and 60% relative humidity.

(4) Any engine or turbine rated less than 500 hp or used for temporary replacement purposes shall be exempt from the emission limitations of paragraphs (2) and (3) of this section. Temporary replacement engines or turbines shall be limited to a maximum of 90 days of operation after which they shall be removed or rendered physically inoperable.

(5) Gas fuel shall be limited to: sweet natural gas or liquid petroleum gas, fuel gas containing no more than ten grains total sulfur per 100 dry standard cubic feet, or field gas. If field gas contains more than 1.5 grains hydrogen sulfide or 30 grains total sulfur compounds per 100 standard cubic feet (sour gas), the engine owner or operator shall maintain records, including at least quarterly measurements of fuel hydrogen sulfide and total sulfur content, which demonstrate that the annual SO_2 emissions from the facility do not exceed 25 tons per year (tpy). Liquid fuel shall be petroleum distillate oil that is not a blend containing waste oils or solvents and contains less than 0.3% by weight sulfur.

(6) There will be no violations of any National Ambient Air Quality Standard (NAAQS) in the area of the proposed facility. Compliance with this condition shall be demonstrated by one of the following three methods:

(A) ambient sampling or dispersion modeling accomplished pursuant to guidance obtained from the executive director. Unless otherwise documented by actual test data, the following nitrogen dioxide (NO_2)/NO_X ratios shall be used for modeling NO_2 NAAQS;

Attached Graphic

(B) all existing and proposed engine and turbine exhausts are released to the atmosphere at a height at least twice the height of any surrounding obstructions to wind flow. Buildings, open-sided roofs, tanks, separators, heaters, covers, and any other type of structure are considered as obstructions to wind flow if the distance from the nearest point on the obstruction to the nearest exhaust stack is less than five times the lesser of the height, Hb, and the width, Wb, where:

Attached Graphic

(C) the total emissions of NO_X (nitrogen oxide plus NO_2) from all existing and proposed facilities on

the property do not exceed the most restrictive of the following:

(i) 250 tpy;

(ii) the value (0.3125 D) tpy, where D equals the shortest distance in feet from any existing or proposed stack to the nearest property line.

(7) Upon issuance of a standard peunit for electric generating units, registrations under this section for engines or turbines used to generate electricity will no longer be accepted, except for:

(A) engines or turbines used to provide power for the operation of facilities registered under the Air Quality Standard Permit for Concrete Batch Plants;

(B) engines or turbines satisfying the conditions for facilities permitted by rule under Subchapter E of this title (relating to Aggregate and Pavement); or

(C) engines or turbines used exclusively to provide power to electric pumps used for irrigating crops.

Source Note: The provisions of this §106.512 adopted to be effective March 14, 199.7,22 TexReg 2439; amended to be effective September 4, 2000, 25 TexReg 8653; amended to be effective June 13, 2001, 26 TexReg 4108

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TITLE 30	ENVIRONMENTAL QUALITY
PART 1	TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
CHAPTER 111	CONTROL OF AIR POLLUTION FROM VISIBLE EMISSIONS AND PARTICULATE MATTER
SUBCHAPTER B	OUTDOOR BURNING
RULE §111.207	**Exception for Fires Used for Recreation, Ceremony, Cooking, and Warmth**

Outdoor burning shall be authorized for fires used solely for recreational or ceremonial purposes, or in the noncommercial preparation of food, or used exclusively for the purpose of supplying warmth during cold weather. Such burning shall be subject to the requirements of §111.219(7) of this title (relating to General Requirements for Allowable Outdoor Burning).

Source Note: The provisions of this §111.207 adopted to be effective September 16, 1996, 21 TexReg -8509.

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PART 1 TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
CHAPTER 111 CONTROL OF AIR POLLUTION FROM VISIBLE EMISSIONS AND PARTICULATE MATTER
SUBCHAPTER B OUTDOOR BURNING
RULE §111.211 **Exception for Prescribed Burn**

Outdoor burning shall be authorized for:

(1) Prescribed burning for forest, range and wildland/wildlife management purposes, with the exception of coastal salt-marsh management burning. Such burning shall be subject to the requirements of §111.219 of this title (relating to General Requirements for Allowable Outdoor Burning), and structures containing sensitive receptors must not be negatively affected by the burn._When possible, notification of intent to burn should be made to the appropriate commission regional office prior to the proposed burn. Commission notification or approval is not required.

(2) Coastal salt-marsh management burning conducted in Aransas, Brazoria, Calhoun, Chambers, Galveston, Harris, Jackson, Jefferson, Kleberg, Matagorda, Nueces, Orange, Refugio, and San Patricio Counties. Coastal salt-marsh burning in these counties shall be subject to the following requirements:

(A) All land on which burning is to be conducted shall be registered with the appropriate commission regional office using a United States Geological Survey map or equivalent upon which are identified significant points such as roads, canals, lakes, and streams, and the method by which access is made to the site. For large acreage, the map should be divided into manageable blocks with identification for each defined block. The information must be received for review at least 15 working days before the burning takes place.

(B) Prior to any burning, notification, either verbal or written, must be made to, and authorization must be received from the appropriate commission regional office. Notification must identify the specific area and/or block to be burned, approximate start and end time, and a responsible party who can be contacted during the burn period.

(C) Such burning shall be subject to the requirements of §111.219 of this title.

Source Note: The provisions of this §111.211 adopted to be effective September 16, 1996, 21 TexReg 8509.

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DIVISION 4	**MATERIALS HANDLING, CONSTRUCTION, ROADS, STREETS, ALLEYS, AND PARKING LOTS**
RULE §111.143	**Materials Handling**

No person may cause, suffer, allow, or permit any material, except for abrasive material for snow and ice control, to be handled, transported, or stored without taking at least the following precautions to achieve maximum control of dust emissions to the extent practicable:

(1) application of water or suitable chemicals or some other covering on materials stockpiles and other surfaces which can create airborne dusts;

(2) installation, maintenance, and proper use of hoods, fans, and filters to enclose, collect and clean the emissions of dusty materials; or

(3) application of water or suitable chemicals, or complete covering of materials contained in open-bodied trucks, trailers, or railroad cars transporting such materials which can create airborne particulate matter in areas where the general public has access.

(A) Suitable wetting may be used as an alternative to covering in all areas except the City of El Paso.

(B) Complete covering, at a minimum, is required in the City of El Paso.

Source Note: The provisions of this §111.143 adopted to be effective July 18, 1989, 14 TexReg 3293.

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